UNIVERSITY OF KWAZULU-NATAL

Evaluation of the Adoption of Information and Communication Technology in Secondary School Management

By

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DECLARATION

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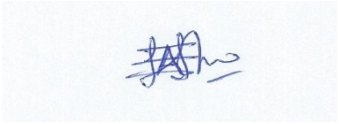

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ABSTRACT

In this Information and Communication Technology (ICT) era, any business transactions can now be effectively and efficiently carried out to realise organisational goals, with education administration in secondary schools not spared. Specifically, this research was driven by the realisation that despite support by the Department of Education through the purchase of ICT infrastructure, these resources remain underutilised and therefore, become obsolete. While there is considerable literature on the use of ICTs in supporting learning and teaching, not much has been covered on the use of ICTs in managing secondary schools. The cited theories revealed that ICT usage in the management of secondary schools were likely to improve the quality of education.

This study therefore aimed at evaluating the use of ICT in the management of secondary schools in Mashishila Circuit. The quantitative research method was used to analyse data. In order to achieve this objective, the researcher employed purposive sampling, where 77 respondents from senior management teams (SMT) were drawn from Mashishila circuit, which had a total population size of 152 staff members. The sample comprised 28.6% males and 71.4% females, with the majority of the respondents (40.3%) being in the 50 to 59 age group. The researcher collected data using a questionnaire that was tested to generate relevant data.

The results of the study revealed that there was sufficient evidence to suggest that ICT for management was being used in some secondary schools of the Mashishila Circuit, although insignificantly. The results also showed that the majority of the senior managers lacked ICT management professional qualifications, with some of them having received little training in the area. However, over the years, they have developed hands-on skills, with regards to carrying out different managerial activities through self - discovery. This was attributed to some informal training which they received from the Department of Education. It was also revealed that several reasons negatively impacted on the senior managers' willingness to use ICT for management in schools. These were seen to be dealt with by the various authorities, including the Department of Education and education officers. Further findings showed that ICT for management tended to improve managerial duties of leaders in these schools. Additionally, school leaders were

able to monitor financial records and stores quite effectively using ICTs. Based on these findings, the study therefore recommended that leaders of schools needed to structure their activities through cooperation and the adoption of ICTs. This was to be supported by control objectives of information related technologies. The study further recommended some future enquiry that deals with an integrated system incorporating school management with education district and regional offices, through comprehensive training and empowerment, specifically focusing on the use of ICTs in the management of secondary schools.

Key words: *Innovation, Information, Communication, Technology*

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List of Abbreviations

Acronym	Definition
CM	Concept Matrix
COBIT	Control Objectives for Information-Related Technologies
DOI	Diffusion of Innovation
DoE	Department of Education
ICT	Information and Communication Technology
IQMS	Integrated Quality Management System
ITIL	Information Technology Infrastructure Library
PEOU	Perceived Ease Of Use
PU	Perceived Usefulness
SMT	School Management Team
TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
UTAUT	Unified Theory of Acceptance and Use of Technology

CHAPTER 1

OVERVIEW OF THE STUDY

1.1 Introduction

The main objective of this study is to assess the use of Information and Communications Technology (ICT) in secondary school management. This chapter begins by outlining the background and the purpose of the study. It continues with the research objectives curtailing from the research questions. An analysis of the use of ICT in management of secondary schools is presented. The key concepts relevant to this research are also defined alongside the adoption of technology in the management of secondary schools. The chapter further discusses the justification of the study. It concludes by outlining the work to be covered in the subsequent chapters.

1.2 Background to the study

There has been an increased student enrolment in South African schools over the years, prompting the use of Information Communication Technologies (ICTs) as an essential component in the management of secondary schools. In the context of this study, the phrase Information and Communication Technologies (ICTs) refers to the software, hardware, media and networks for gathering, storing, handling, communicating and producing facts and those linked facilities (Muchai & Kimuyu, 2016, p. 21). The following description has been provided by García-Muñiz and Vicente (2014):

> "Information and communication technologies (ICTs) are broadly defined as technologies used to convey, manipulate and store data by electronic means. This can include e-mail, SMS text messaging, video chat (e.g., Skype) and online social media (e.g., Facebook). It also includes all the different computing devices (e.g., laptop computers and smart phones) that carry out a wide range of communication and information functions. All these electronic tools constitute the Information and Communication Technologies (ICTs) and are used to convey, manipulate and store information" (García-Muñiz & Vicente, 2014, p. 41).

Andrade and Doolin (2016) defined an evaluation as “a rigorous analysis of completed or ongoing activities that determine or support management accountability, effectiveness and efficiency. Evaluation of completed activities is called ex-post evaluation, post-hoc evaluation, or summative evaluation. Evaluation of current or on-going activities is called in-term evaluation” (Andrade & Doolin, 2016, p.14). As such, in-term evaluation is the most applicable to this study, which seeks to evaluate how the use of ICT in management has helped effectiveness in the running of the institutions.

Personnel subjugating directorial positions are involved in decision-making responsibilities, irrespective of either the position that they hold, or the type of the responsibilities allocated to them (Xinaris, 2016). According to Brun and Hinostroza (2014), every educator who is empowered to execute responsibilities concerning the institution and making decisions, governance and formulating of policies, is indeed involved in institution management, which necessitates the instigation and preservation of vibrant communication that could lead to more operational management. In a secondary school, the school management team (SMT) comprises the heads of departments, the senior educators, deputy principals and principals.

New technological developments have made South African educational institutions to become complex and multi-dimensional entities demanding remarkable contribution with regards to financial, physical and human resources (Nica, 2015). The tremendous advancement in technology resulted in comprehensive growths in the management structure, hence, the call for facilities such as ICTs to help process data and carrying out tasks affecting students, personnel, financial management, timetabling, tests, resources and the general school administration (Mbatia, 2014). Technology in education and organisational systems is therefore vital in enhancing efficiency (Osembe & Padayachee, 2016).With the emerging technologies, it becomes necessary to introduce efficient and effective information technology systems in secondary schools. Most schools leaders are reluctant to adjust to the use of technology, due to the lack of skills, as well as due to the lack of ICT policies driven by the department (Peeraer & Van Petegem, 2011). This could have led to minimal benefits in appreciating the use of technology.

1.3 Purpose of the study

The researcher is an educator in one of the schools under study. Through observation of the school management teams in secondary schools in Mashishila Circuit (such as Highveld, Takheni and Chief Jerry), the researcher noted that the Department of Education (DoE) supplies up-to-date ICT resources to these schools, with the determination to refining their activities, both in class and in management. Unfortunately, these schools may be failing in making use of the available ICT resources, or they have not been effectively making use of them. The major obstacle in this regard could be the lack of ICT skills and knowledge amongst these school leaders (Ezekoye, 2017). In schools where such resources exist, such as Highveld Secondary School, the resources might not be fully utilised to benefit school management.

1.3.1 Problem statement

Building on the agency theory's viewpoint as a characteristic of management exercise, Martinsuo (2013) claimed that the use of technology as a resource for controlling school leaders can safeguard their individual benefits, as well as the welfare of the stakeholders, to effectively accomplish performance of their schools. Control is the determination of intervention and the foundation for agency theory, while institutional control is one of the utmost essential areas of management activities (Abdillah, 2014).

Control means the school leaders' activities and efforts are guaranteed to be accomplished by some people and ICTs reinforce the managers' capability to control by collaborating information hastily through expanses and using computational procedures (Dias & Diniz, 2014). This research therefore evaluates how the ICT facilities provided by the DoE have helped to foster administration work in the management of secondary schools by the SMT. Fox (2016) established that while the introduction of networked ICTs into the administrative setting is destined to empower the employees, it also upsurges the capability of the institutions to use consolidated measures and observations. This research thus endeavoured to establish the degree of technological skills possessed by the senior management teams in secondary schools. Furthermore, Hammond (2014) recognized that ICT deployment has had a substantial influence on the transformation happening in societies, organisations and the economy at large. Institutions are social entities that dwell for excellence and better working conditions to

yield the results (Nilsen, 2015). This research thus seeks to evaluate the use of ICTs by school leaders in managerial activities. In view of that, the study has the following objectives.

1.3.2 Research objectives

The main aim of this study is to evaluate how ICTs have enabled the secondary schools in Mashishila Circuit in management. The following objectives have been identified for this research:

1. To determine the degree of technological skills possessed by school management teams in secondary schools.
2. To investigate the use of ICTs in secondary school management.
3. To determine the contribution of ICTs in improving the effectiveness of management in secondary schools.

1.3.3 Research questions

Given the problem statement described earlier in this chapter, the researcher identified the following research questions:

1. What are the levels of technological skills possessed by senior management teams in secondary schools?
2. How are ICTs used by management in secondary schools?
3. How have ICTs contributed to the effectiveness of secondary school management by the SMT?

1.4 Significance of the study

This study refers to the past, the current and the prospects of the managerial structures and systems in schools, the study would therefore make recommendations aimed at backing the integration of ICTs in the management of schools. It is feasible that information Technology (IT) governance would use interrelated notions such as Control

Objectives for Information-Related Technologies (COBIT) and Information Technology Infrastructure Library (ITIL) in secondary school management. Such ICT processes could be combined with the use of balance score card in appraising the aims and objectives of the education system. The execution of IT governance must begin with the school leaders and spread to the pedigrees of the whole institution, hence the SMT formed the target group. The essence of this study is to investigate why so many schools are lagging behind in terms of management. Ubiquitous computing clearly states that in the near future, computers will be doing everything for the human being (Chafi & Elkhouzai, 2017). In South Africa, many government schools in the country have been furnished with computers, yet the principals of the schools keep them packed in their boxes, probably because of ignorance or the lack of knowledge and skills regarding the use of computers (Chafi & Elkhouzai, 2017).

1.5 Definitions of key concepts

1.5.1 Information and Communication Technology in school management

Information technology (ICT) management is "…the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware" (Li & Garnsey, 2012, p.28). This definition highlights the essence of information and its management in enhancing the quality of decision making, regarding the use of appropriate technologies. With technological development, South African schools introduced several learning strategies supported by legislative pieces which saw a number of modifications being implemented through the Department of Education and the Schools Management Team (SMT) (Manyau, 2015).

Some of the modifications include the Telecommunications Act (103 of 1996), which encourages schools to adopt information systems infrastructure in order to improve the management of schools. For example, schools could be connected online and be accorded the opportunity to share resources. With the aid of this policy, many schools would use services such as the internet to access emails, as well as capturing learners' profiles (Shin, 2015). Further, the 1998 legislation introduced ICT projects in schools, integrating socio-economic growth plans (Vandeyar, 2015). With these legislative

stipulations, it therefore became imperative to investigate the extent to which these efforts have been integrated into school management systems, particularly in secondary schools.

1.5.2 Technology adoption

Wambeti (2016) defines the adoption of technology as "… the execution of the software and hardware technology in an organisation to intensify production, sustainable benefits, progress dispensation speediness and provide information easily accessible" (Wambeti, 2016, p.4). Hadjithoma-Garstka (2011) argues that when change is not managed effectively, the results usually have negative consequences. The adoption of ICTs in schools presents challenges that require principals to be adequately trained if their endeavours are to bear fruit (Chafi & Elkhouzai, 2017). It is still evident that a number of school leaders, particularly those in the rural areas, lack the requisite skills to effectively utilise information technology in a bid to improving the quality of decision making.

1.5.3 Secondary schools

Le Roux and Evans (2011) define a secondary school as "an institution that offers formal schooling from Grade 8 to Grade 12. An institution that offers only a selection of grades from Grade 8 to Grade 12 is also referred to as a secondary school" (Le Roux & Evans, 2011, p.15).

1.6 Summary of chapters

A synopsis of all the chapters is outlined below:

- **Chapter 1** presents the reasons behind this study, the context of the study, the objectives and research questions, as well as concise descriptions of the concepts used in this work.

- **Chapter Two** discusses the literature review and the theoretical framework that provide insights into an understanding of the problem under focus. The literature review covers issues like ICT usage in the management of secondary schools, as well as the gaps in this regard. The theoretical framework highlights the theories of Information Technology that are related to the adoption of an innovation.

- **Chapter Three** describes the research design and methodology, the procedures employed to collect data from the respondents. It goes on to explain the data capturing and analysis procedures. Lastly, the literature survey, the concept matrix, the limitations of the study, rationality and dependability, as well as the ethical considerations, are discussed.

- **Chapter Four:** presents and analyses the findings of the study.

- **Chapter Five** outlines the deductions based on the cited works, the findings of the research. It closes with whether the valuation of the aim and purpose of the investigation have been achieved. The chapter concludes the study by making recommendations, as well as highlighting areas for further research.

1.7 Conclusion

This chapter has presented the background and purpose of this study. This is followed by the research objectives and questions underpinning the study. Definitions of evaluation, adoption and the use of ICT for management, which are of essence to this work, have been clearly articulated. The justification for the study is also highlighted. The chapter concludes by elaborating on work to be covered in each subsequent chapter. The following chapter discusses the literature review.

CHAPTER 2

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

In the previous chapter, the background, the problem statement, objectives, research questions and the justification of this study, were discussed. This chapter is divided into two parts. The first part examines the literature relevant for this research. The aim is to compare what has already been achieved by previous authors and what will be carried out in this research. The researcher looks at the different ICT related articles, the gaps that exist in relation to the study and the benefits and barriers to ICT use in school management. The first part specifies the different managerial structures of the school management team. These structures include the administration heads, administration educators and administration personnel. Their job descriptions are laid out in relation to the use of the technology. The chapter also assesses the literature, with the mandate to deliberate on the significance of ICT use in school management, the managerial structures that exist in secondary schools and how these aid ICT use in the management of secondary schools. The chapter continues with an argument on the transfer in the management paradigm, the capabilities that come with ICT use in secondary school management, the obstacles encountered by the management during ICT adoption in schools and finally, recommended elucidations in South Africa, in particular. The second part of this chapter is on the theoretical framework. Reviews of the different kinds of theoretical frameworks which are related to the adoption of the innovation, will be presented. The disadvantages and advantages of each are spelt out. A comparison of the models presented is followed by the selection of the framework suitable for this research and the reasons behind its selection are also explained. It then concludes by identifying the disadvantages of the chosen model, as well as how this research seeks to circumvent them.

2.2 The use of ICT in the management of schools

Vandeyar (2015) observed that there are characteristics that school administrators might have, concerning ICT in management methods. Such aspects comprised attitude

towards Information Management Systems use. He argued that leaders of schools make numerous pronouncements beneath circumstances of improbability. As such, it over-burdens vital facts that require looking into, with diminutive handling period and consideration (Alharbi & Drew, 2014). The leaders of schools do not frequently assess the results and trends of their respective institutions (Cummings & Worley, 2014). This therefore is not surprising that Information and Communication Technology is still not utilised fully in secondary school management.

Institutions in many countries are becoming more autonomous and accountable (Altbach, 2015). In the technological, economic and social settings in which secondary schools are situated, SMTs have become answerable to governors, local authorities and parents, through policy commands and assessments (Wilkins, 2016). Whatsoever the ultimate consequences of the unequal opinions communicated, schools have been given the mandate to train educators in order to improve their quality of work (Konyana & Konyana, 2013).

Mihai and Nieuwenhuis (2015) used the matrix theoretical approach to identify the challenges that the schools in Mpumalanga may be facing in adopting ICTs for management. They concluded that effective management in educational organisations is becoming increasingly recognised. Schools are likely to be much more effective if they are well managed (Buabeng-Andoh, 2012). They also concluded that there is need for the school management teams to drive the implementation of ICT management in schools (Monczka, Handfield, Giunipero & Patterson, 2015). Looking at the way schools are run in South Africa, there is need to come up with a department that is accountable for the implementation of ICT management in schools (McLaren, 2015).This would assist in driving the schools in implementing key ICT management goals. This department should be responsible for training, planning, coordinating and strategizing the running of schools (Mpinganjira & Mbango, 2013). This kind of department would assist in looking at the strengths, weaknesses, opportunities and threats of the schools in terms of management. This further remains to be seen if such a department exists in the management of secondary schools.

Prokopiadou (2012) conducted research in Greece schools' administration. His research concluded that there is need to create and adopt a school policy in order to adjust to the

introduction of ICT into the school environment. The research also concluded that, while ICT practice in school management is of dynamic significance for providing progressive managerial facilities and, due to the lack of elementary factors, principals are powerless to adequately adventure technical competences for the advantage of their managerial efforts.

This Greece scenario is almost similar to the South African one, whereby many rural schools have been furnished with IT resources, yet they fail to take full benefits of this technology in yielding the best managerial practices (Lemmer, 2012). As such, in some of the schools studied, the leaders are still practising the manual filling systems. Sallis (2014) suggested that much work has to be done, based on the school policy, for example, integrating ICT management in schools. In the South African context, school policies have to be modified to allow the adoption and implementation of ICT management in secondary schools (Mtebe & Raisamo, 2014). School policies need to be amended to be parallel to the fast evolving technological era. This is so because this would give accountability on the part of the leaders of the schools, if the Department of Education does auditing of school resources. As such, many principals need to be trained in order to allow a smooth transition to the ICT management in schools (De Wet, 2016).

In another research, Bush (2016b) discovered that schools in Abu Dhabi are going through a period of reform and new responsibilities have been allocated to principals. The United Arab Emirates (UAE) reform agenda is underpinned by the ambition that it would have one of the best education systems in the world, an aspiration shared by many governments. The UAE government is undergoing professional development for principals as they consider it to be a crucial aspect of the reform agenda (Mihai & Nieuwenhuis, 2015). As this researcher is an educator in the said circuit schools and having observed how the leaders of some of the schools operate, this could be a crucial approach in the South African context. By training the principals how ICTs can be delivered in schools as a management tool, this can have a positive effect on how schools are run. Every South African principal has a computer, yet there is need to enrich these principals with the benefits of ICT managements.

Adu and Olatundun (2013) conducted a research on ICT usage in the management of

schools in Malaysia. Their conclusion was that while the Ministry of Education was playing a significant role in promoting Smart Schools, the achievement of its execution obviously needs obligatory measures at all stages. Malaysia is a developing country, just like South Africa. Their government is also investing in information technology. South African schools have been furnished with computers, but the main drawback is the lack of development programs on the part of the principals (Bush, 2016a). Principals need to be trained on the use of ICTs in management.

Mathonsi (2006) researched change management in schools in the KwaZulu-Natal Province in South Africa, particularly with the introduction of Integrated Quality Management System (IQMS). IQMS is a unified quality management system, with the objective of improving the observing performance of the education structures. It is incorporated with performance measurement, whole school evaluation and developmental appraisal. The researcher concluded that although modifications are significant, it is important that administrators of change are mindful of how the staff members feel concerning the change process (Mathonsi, 2006). They must be aware that people exposed to change go through several attitudes and emotions through the change process. It is usual, but requires to be considered when handling and employing a new technology. Just like IQMS, the implementation of ICT in the management of schools is a very good example of change management (Mathonsi, 2006). This involves changing the attitudes of the leaders of the schools in order to adjust to the new management practice. These systems include using the manual filing method to capture information, thus, the need to adopt the information technology management approach.

According to Beck (2015), available data show that most unindustrialised countries such as South Africa in Southern Africa are behind in terms of information technology transformation. This mere expedition for the implementation and adoption of ICT in schools running has been challenging and will need essential radical transformations in the controlling atmosphere. There is no uncertainty that African populations are missing out on the advantages of ICT in schools management (Wolhuter, 2014). Cullen and Parboteeah (2013) observed that information and communication technologies have improved schools management across the continent. Nevertheless, most schools in South Africa rarely practise the use of ICT to achieve the value of productivity (Hudson, 2013). Despite the fact that the use of ICT systems can advance principals'

efficiency, or to decrease expenditures through examining costs, very few schools might have adopted the use of ICT in management (Hislop, 2013). This is caused by a number of factors affecting most schools in South Africa, with respect to the implementation and adoption of ICT in management (Ebere, 2016). This has therefore caused a sluggish degree of acceptance of ICTs, regardless of their potential and promise for use in the running of schools (Yang, 2012).

In South Africa, schools have adopted the use of computers as a technical subject, as opposed to incorporating it in management (Nkula & Krauss, 2014). The use of ICTs in the running of schools has been less emphasized. This therefore calls for a new strategy that necessitates schools to be amenable to the alterations ICTs can facilitate. Bradley (2016) specifies that ICTs have achieved a significant part in improving management in schools, by providing data to the societies through accessing information on websites.

The use of ICTs in the management of secondary schools embroils binding the technology for improved preparation, establishing values, achieving transformation and checking outcomes of the essential roles of the institution. Onyije and Opara (2013) support the idea that ICTs are indeed used in communication, documents management and maintenance of records. According to Oboegbulem and Ugwu (2013), the use of ICTs in the management of secondary schools has transformed the way the schools are being managed, by permitting transfer, retrieval and storage of information.

Muriko (2015) agrees that ICT use in the management of schools has enhanced effectiveness in school functional activities, particularly in handling information about staff and student particulars. Founded on this understanding role, Makewa, Role & Nyamboga (2011) emphasised that the assimilation of ICT into the management of secondary school practises improves the general students and staff records by making them available to many. On employee management, Wiseman and Anderson (2012) stated that ICT has allowed the distribution of responsibilities, management of leave days, performance appraisal and attendance, rising competence in the distribution of tasks.

2.3 ICT and financial management in schools

The acceptance of management of schools through the use of ICT is quickly becoming essential, especially in the management of finance. In this regard, Ngugi (2012) stated that the use of ICT has developed to be valuable for keeping and analysing data in management of school finances which consist of budget provisions, expenses, learners' payment of fees and accounting in general. Furthermore, Roberts and Sikes (2011) agreed that as a characteristic of school finance control, in order to facilitate budgeting, secondary schools need the accessibility of numerous foundations of information to handle. This could be achieved through the integration of ICT systems in management.

Provisions of budget in school management are convoluted procedures needful of reliable, suitable, accessible information for assisting decisions in management. According to Makhanu and Kamper (2012), leaders of institutions have exploited the use of computers in preparation and controlling of school finance, which has significantly enhanced management. The leaders of schools are obliged to have elementary knowledge on supply procurement and management, in order to brand valid judgments in the controlling and monitoring of budget (Mshanga, 2014). Kerubo (2016) specified that ICTs were precarious in refining school financial management over providing the necessary data to students, government and parents.

2.4 ICT in management as the innovation

ICT applications are being used in administration and management to encourage developments in schools. Innovations of software and applications are a part of a program that executes valuable assignments for the schools (Mokgadi, 2015). These applications include word processing, creating a presentation, desktop publishing and emailing (Morley & Parker, 2014). In order to achieve their mandates, the schools have three core administration sets that are in the forefront in using ICT in their activities and these include the administration heads, administration educators and administration staff (Burden, 2016).

2.4.1 Administration heads

Shah (2014) observed that the leaders of the school should have elementary abilities of using ICTs in the management of schools in order for easy administrative work. The leaders of the school act like role models when technology is adopted in dealing with managerial tasks. Instructional leaders enable educators' incorporation of the innovation teaching and learning (Nguyen & Burgess, 2014). Transformational leaders inspire imagination, progressiveness and enable circumstances that produce a constructive atmosphere for the innovation adoption (Hadjithoma-Garstka, 2011).

According to Klionsky *et al*. (2012), school administrators frequently use PowerPoint presentation to provide training in a stimulating manner. Mwalongo (2011) also discovered that the leaders of schools use ICTs to make notices, write letters for meetings, generate academic reports, keeping staff and learners' records and enabling learner registrations. Mwalongo (2011) also agrees that the innovation is also used by the leaders of the schools for effective decision making, information storage and online applications.

Schwartz, Webb & Mennin (2001) observed that instructional principals indirectly and directly regulate the realisation or catastrophe of educator capabilities in the use of the innovation. Such principals also contribute in assimilating the innovation into the teaching of the syllabus by the teachers. The school leaders play a key part in enabling fruitful culture for a conducive environment and thus, making it possible for their educators to adopt innovation so that transformation may be achieved (Afzal & Lawrey, 2012).

2.4.2 Administration educators

These are the educators who, apart from teaching, are also involved in the administrative duties for the school. The administration educators are the heads of departments, as well as the senior educators of the school, who are responsible for the running of the school, giving ideas to the heads of administration (Fayol, 2016). The heads of departments are in charge of handling teacher profiles and the learners' records. Educators in these departments have to preserve all of the learners' records in

specific arrangement (Ofili, 2014). Such records contain learners' cumulative records, informative and formative evaluations which can be printed out on demand.

In their study, Ghavifekr, Afshari, Siraj & Seger (2013) indicated that ICT for management is used to plan teaching, schemes of work, making timetables and generating reports for numerous dimensions. Such educators can set assessments and upload online tasks that can be spontaneously rated, saving a vast amount of time, either for marking and rectification procedures. Results can also be generated by using the innovation on websites and portals online for learners to retrieve the tasks (Gedwar, 2016).

2.4.3 Administration personnel

ICT for management can be used by the clerks for carrying their day to day duties, enabling them to do their duties quicker and in a more precise manner. The administrative personnel use diverse tools to deal with the school finance related work, uphold links among stakeholders, record keeping, processing of documents and the collection of information (Entwistle & Ramsden, 2015). Using ICT for management, such tasks are made to be accomplished efficiently and effectively (Shah, 2014). Furthermore, ICT for management also assists staff personnel to record school financial papers such as payslips, reports for auditing, taking stock and keeping learner records (Gedwar, 2016).

2.5 Benefits of ICT for management

In learning institutions, management is a difficult procedure that needs timely and reliable data (Daniel, 2015). According to Kerubo (2016), ICT is key to keeping and analysing data on learning pointers; educational records, students' assessments, physical infrastructure and budget. The same essentials of ICT resources and provisions that have made industries more effective can be useful to the management of schools (Child, 2015). The use of ICTs can assist administrators and principals of schools to modernise processes, observe performance and increase the use of resources. The use of ICTs encourages communication among parents, schools, businesses and central decision makers, thus promoting responsibility, connectivity with market place and public

support (Matthews & Rix, 2013).

According to Biagi and Loi (2013), a number of factors can be considered when an innovation has to be implemented. These factors can be positive or negative. They further categorized the factors as illustrated in Table 2.1.

Table 2.1: Advantages and disadvantages of ICT in school management

Advantages	**Disadvantages**
Provides up-to-date information to parents	School management systems are expensive to buy
Easy to search for records (e.g., to go back a week to see if a student was in class	Personal data (address, medical, etc) must be secured, so security measures have to be implemented. This is expensive.
Easy to update records	These systems are often complex to use. Staff and teachers need to spend time training.
They help tackle truancy (e.g., systems shows if a student attends period 4 but misses period 5)	
Easier for teachers to produce and print student reports	
Some systems work online, which allows parents to see progress from home	

Adopted from Biagi and Loi (2013, p.12)

According to Biagi and Loi (2013), the above table is an overview of the positive and negative factors that accompany the use of ICTs in management. It remains to be seen whether these factors do exist in the secondary schools in the Mashishila Circuit and whether these schools have benefited positively or negatively, with regards to the use of the technology.

2.6 Hindrances to the adoption of ICTs in secondary schools

Schools have their own distinctive cultural settings. Denis (2014) observes that most transformations in school management are unsuccessful because of inconsistent adoption of ICT technologies. Administrators and educators see negligible achievements through the use of ICTs and therefore, only resort to the negatives that are anticipated with the use of it (Ekundayo, 2013). The benefits related to enabling the revolution towards the administrator's approaches, behaviour and values become wholly minimized and therefore overlooked (Alenezi, 2015). Sarup (2017) suggested that change in the management of institutions mean altering norms, insolences, values and opinions related to the school culture. Academics have established specific models that can assist school management (Yadav, Pandey & Rautaray, 2016). The beliefs include collegiality, introspection and a common logic of vision combined to generate values that back innovations in schools management (Earley & Greany, 2017). As such, the lack of ICT management policies in schools leads to lack of accountabilities (Kale & Goh, 2014). This therefore might call for managers of the schools to be equipped with the necessary training in ICT management.

2.7 Obstacles to the use of ICTs in management

Basically, barriers are those factors that impede the use of ICTs in management. They are the obstacles which inhibit leaders of the schools from utilising the full potential of ICT in management. In the research carried out by Latchem (2006), a number of barriers to the use of ICTs in management of schools were discovered. These barriers are categorised into four: factors associated with training, resource related factors, attitude and cultural factors, knowledge and skills (Chitty, 2014). These factors are further subdivided into two main levels. The first level embraces those that are related to the educators, which in this case are the leaders of the schools (Lo, Liu, Yu & Chiu, 2015). The second level refers to those barriers that are related to the school. Below is a further clarity on the kinds of obstacles (Lowyck, 2014). Yang (2012) observes that obstacles recognised in the management of schools can largely be assembled into two phases:

1. The obstacles linking to the institution, considered as first order obstructions
2. Obstacles with regards to managerial set up, which is second order barrier (Liu & Pange, 2015). These serve as key indicators on how the integration of ICTs in secondary school management has been implemented in the Mashishila Circuit.

2.7.1 Leadership barriers to the use of the technology

Kopcha (2010) points to the most commonly arising barriers to the technology integration by leadership in secondary schools.

- Lack of time – for formal training, self-directed exploration and for preparing ICT resources for managerial purposes;
- Lack of self-confidence in using ICT;
- Negative experiences with ICT in the past;
- Fear of embarrassment in front of people and colleagues, loss of status and an effective degrading of professional skills;
- Management difficulties with using ICT, especially where computer resources are poor;
- Lack of knowledge necessary to enable educators to restore technical problems when they occur;
- Lack of personal change management skills;
- Perception that technology does not enhance management;
- Lack of motivation to change long standing pedagogical practices;
- Perception of computers as complicated and difficult to use (Kopcha, 2010, p.55).

2.7.2 School - level barriers

Schnellert and Keengwe (2012) also discovered the following obstacles at an institutional level.

- Lack of ICT equipment and the cost of acquiring and maintaining ICT resources (Ebere, 2016);
- Lack of access to ICT equipment due to organisational factors such as the deployment of computers in ICT suites, rather than offices and classrooms
- Obsolescence of software and hardware;
- Unreliability of equipment;
- Lack of technical support;
- Lack of administrative support;
- Lack of institutional support through leadership, planning and the involvement of teachers, as well as managers in implementing change;

- Lack of training differentiated according to teachers' existing ICT skill levels;
- Lack of training focusing on integrating technology into management, rather than simply teaching basic skills (Keengwe, 2012, p.16).

These factors have much in common with the barriers that may be identified in the Mashishila Circuit schools. The barriers indicated above might help to answer this study's research questions, with regards to skills, accessibility, culture, attitude and relative advantage towards the adoption of the technology. This might as well assist the researcher in assessing whether these barriers have had an influence towards ICT use in the management of schools in the Mashishila Circuit. The key question will be how far the leaders of these institutions have gone in order to address these barriers, if they indeed exist.

2.8 Theoretical framework

A "theoretical framework offers the organisation for this work and is frequently used to clarify phenomena that we practise in the world" (Zhang, 2013, p.5). To begin with, this section recognises appropriate information systems or frameworks that are related to this study, describes these frameworks, deliberates on comparisons of such frameworks and lastly recommends a framework, which will be used in this study.

2.8.1 Major information systems adoption theories

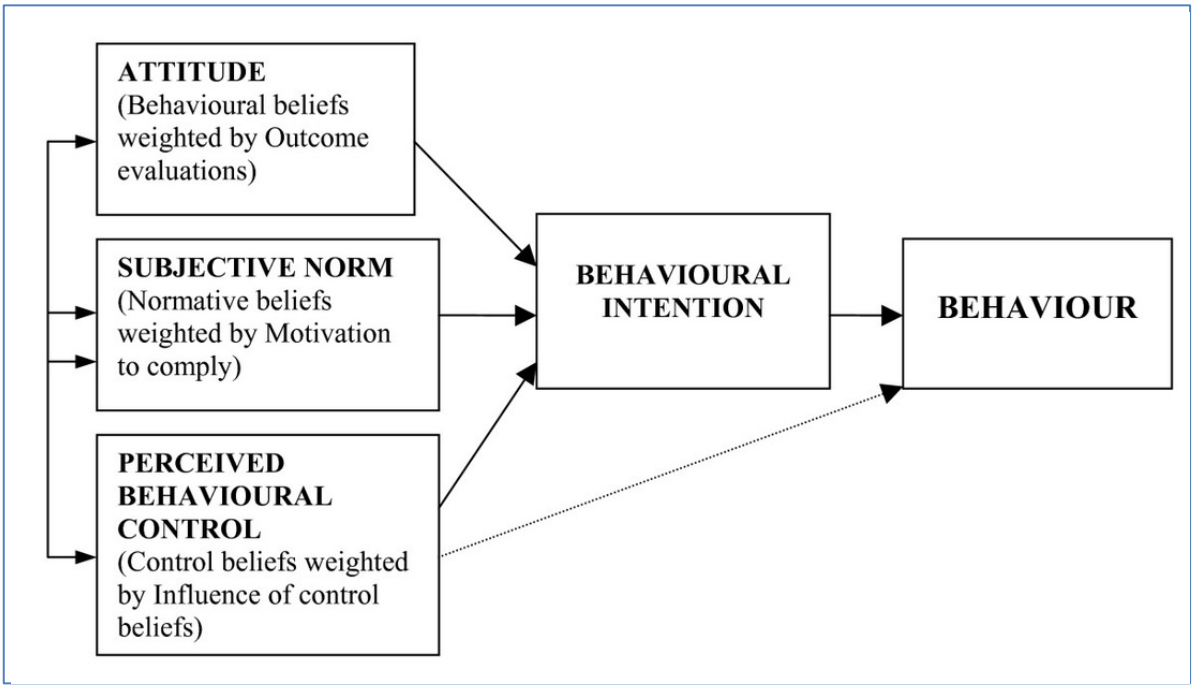
Nowadays, ICT is commonly viewed as a vital instrument in augmenting the effectiveness of the smooth running of any country's economy (Siddiq, Hatlevik, Olsen, Throndsen & Scherer, 2016). It is generally recognised that ICT for management has important effects on the efficiency of running organisations. As such, the adoption of ICTs in the management of secondary schools could also improve the effectiveness of these institutions (Adeyemi & Olaleye, 2010). Such benefits can only be achieved if the technology had been adopted in a positive manner. It is of fundamental importance to comprehend the elements of ICT adoption and the models that have risen in the adoption of ICT (Manueli, Latu & Koh, 2007).

Many theories have been used in information systems investigations. The author is mainly concerned with those theories regarding adoption of the technology. The frequently used theoretical frameworks are the Theory of Reasoned Action (TRA) (Fishbein, 1979), Theory of planned behaviour (TPB) (Manueli *et al.*, 2007, Ajzen, 2011), Technology Acceptance Model (TAM) (Venkatesh & Davis, 2000), Unified Theory of Acceptance and use of Technology (UTAUT) (Venkatesh & Davis, 2000), and Diffusion of Innovation (Rogers & Shoemaker, 1971). These are discussed in the next section.

2.8.2 Theory of Reasoned Action (TRA)

Fishbein (1979) contends that Theory of Reasoned Action is a model that tries to achieve the understanding into how beliefs and attitudes are connected to specific purposes to accomplish. Theory of Reasoned Action is equal to Behavioural Intention. According to Fishbein (1979), Behavioural Intention controls behaviour. He further argued that Behavioural Intention is determined by two main factors which are *attitude regarding behaviour* and *subjective norm*. The attitudes toward behaviour can be defined as a person's personal prediction of how negative or positive that individual will feel when executing the intended performance, while subjective norm can be regarded as a person's insight of the common burden to do the targeted activities. Figure 2.1 represents the Theory of Reasoned Action.

Figure 2.1: Theory of Reasoned Action



Adapted from Fishbein (1979)

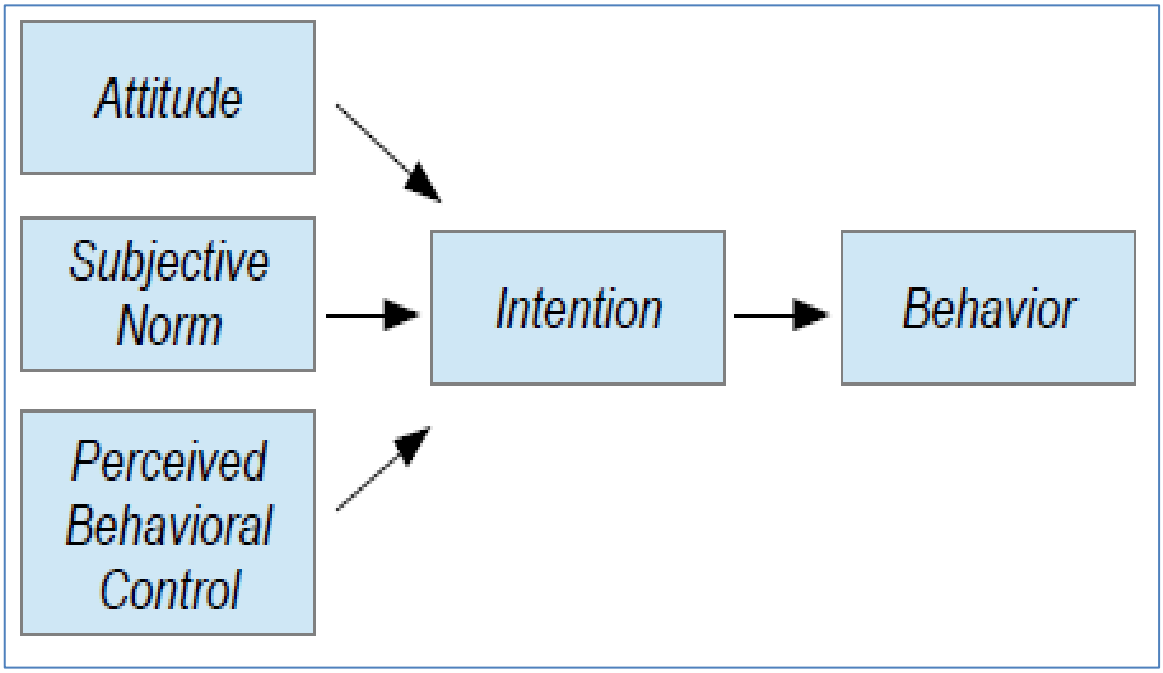
2.8.3 Theory of Planned Behaviour (TPB)

This theory extends the Theory of Reasoned Action to explain circumstances where people do not have comprehensive control regarding their conduct (Ajzen, 2013). Theory of Reasoned Action is equal to attitude concerning behaviour. Subjective norm can be regarded as the supposed societal force to use or not to use supposed system.

Theory of Planned Behaviour = Theory of Reasoned Action + perceived behavioural control

Perceived behavioural control is the degree to which a person considers that she or he is in control over extended or personal issues that may ease or restrain the use of the system. Figure 2.2 is an illustration of the Theory of Planned Behaviour.

Figure 2.2: Theory of Planned Behaviour



Adapted from Ajzen (2013)

2.8.4 Technology Acceptance Model (TAM)

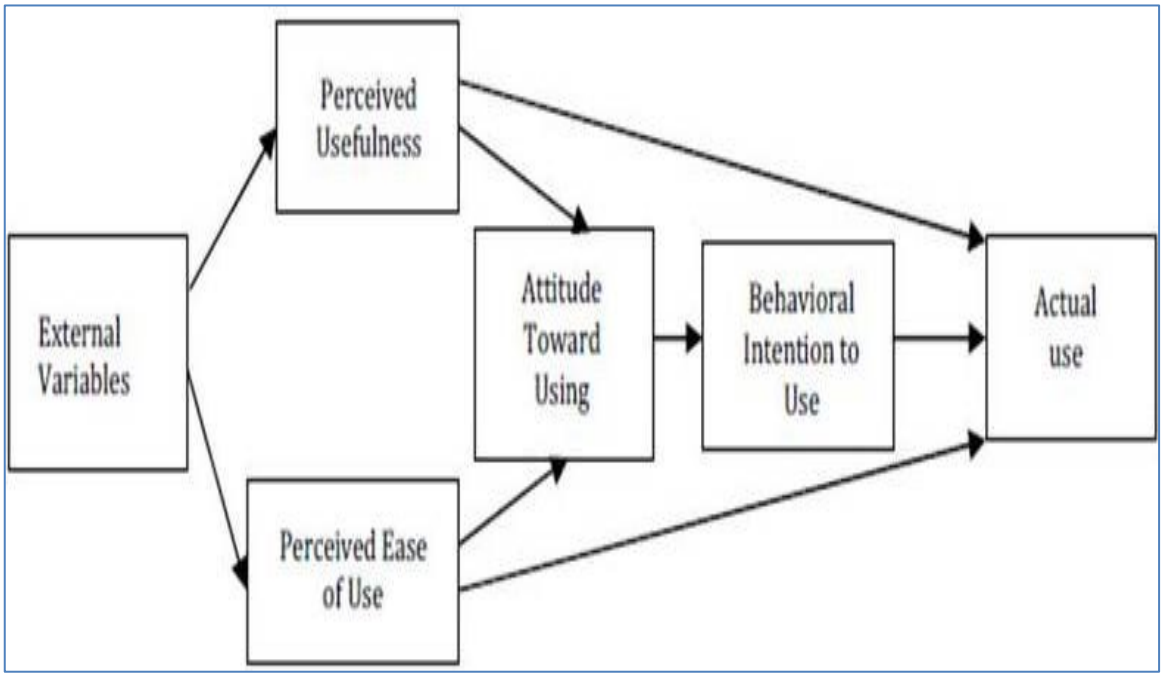
Davis (1989) introduced the Technology Acceptance Model (TAM). The Technology Acceptance Model is a remarkably valuable instrument for forecasting future use of the system, precisely through the phase of user testing stage of any Information System project implementation. The model allocates two important elements: *perceived usefulness* and *perceived ease of use*

1. Perceived usefulness (PU) is "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p.320). Basically, individuals are more probable to use a technological instrument that they consider would assist them to accomplish their work.

2. Davis also defines perceived ease of use (PEOU) as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p.317).

TAM is similar to TRA in that it assumes that real use of a system is directly inclined by individuals' behaviour on the use intention. Nevertheless, these models vary because TAM explains that behavioural intention is mutually determined by perceived usefulness and attitude instead of being directly controlled by attitude and subjective norm, like it is in the Theory of Reasoned Action.

Figure 2.3 Technology Acceptance Model



Adapted from Davis (1989)

When Davis was validating the TAM, he resolved that perceived usefulness is the strongest forecaster of a person's intent to use a technological instrument. According to Davies, perceived usefulness is regarded as an improved forecaster of behavioural intention to use than perceived ease of use.

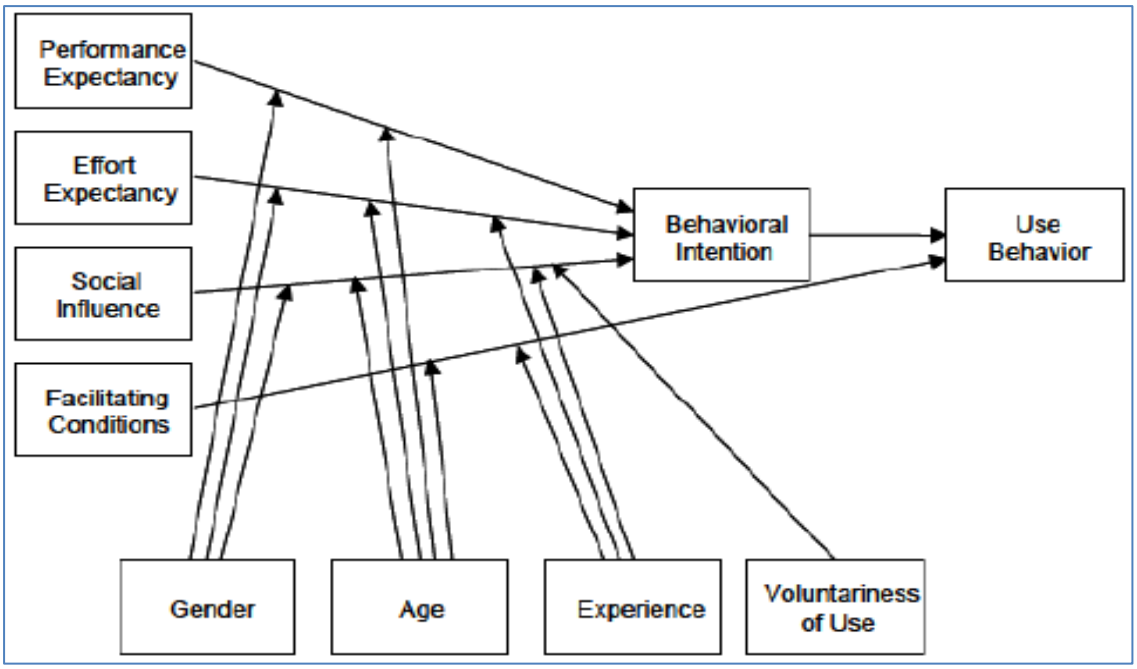
Criticism of TAM has been growing, regardless of its frequency in use, resulting in innovators advocating for the change of its structure. Critics claim that TAM is concerned with quick and easy investigations hence, little consideration has been set to the real difficulty in accepting the technology (Chan *et. al*, 2011). Critics of TAM have also questioned its lack of proper elucidation about reasoning procedures from the acceptance of the technology. The TAM only offers overall indication whether an innovation has been accepted by adopters. Researchers have also argued about the use

of TAM with regards to it adapting to the persistently varying ICT world, which has led to theoretical chaos and misunderstanding (Osadiya, 2008).

2.8.5 Unified Theory of Acceptance and Use of Technology (UTAUT)

Venkatesh and Davis (2000) proposed the combined concrete and realistic resemblances from present theories to produce the Unified Theory of Acceptance and Use of Technology (UTAUT) model.

Figure 2.4: Unified Theory of Acceptance and Use of Technology (UTAUT)



Adopted from Venkatesh et al. (2003)

The UTAUT is an innovation adoption model that determines the user's approval of the technology in a unified view. The purpose of this model is to elucidate the intentions of the user with regards to any technology and its consequent behaviour (Venkatesh & Davis, 2000). This model theory embraces that there are four fundamental ideas:

1) Performance expectancy

2) Effort expectancy

3) Social influence

4) Facilitating conditions

According to Venkatesh *et al.* (2003) performance expectancy, effort expectancy and social influence, determine the usage intention and behaviour, while the fourth determines the usage behaviour. Age, experience, voluntariness and gender are postulated to restrain the influence of the four main concepts on behaviour and usage intention (Venkatesh *et al.,* 2003). This model was established reviewing and consolidating on the concepts of other theories earlier researchers had employed in the use of technology.

Davis *et al.* (1989) criticised this theoretical model and its successive additions, arguing that "UTAUT is a well-intentioned and considerate model, but that it is a model with 41 variables that are independent for predicting usage intentions and at least 8 independent variables for predicting behaviour" (Davis *et al.,* 1989, p.45). They also argued that this model has contributed to the research on the innovation acceptance "reaching a stage of chaos" (Davis *et al*., 1989, p. 55).

2.8.6 Diffusion of innovations model

Rogers (2010) describes how, over time, a clue or an innovation achieves thrust and spreads through a particular society. Diffusion is the development by which a technology is transferred through some conduits through time in a society (Rogers, 2010). This perception of transmission of an innovation ordinarily denotes the spread of concepts from one society to another.

2.8.7 Main components in diffusion of innovation

Roger's effort proclaims that there are four fundamentals that impact on the spread of a new innovation:

Table 2.2: Components of diffusion of innovation model

Component	Explanation
Innovation	Rogers outlines an invention as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption".
Communication channels	He also describes the communication channel as "the means by which messages get from one individual to another".
Time	"The innovation-decision period is the length of time required to pass through the innovation-decision process". "Rate of adoption is the relative speed with which an innovation is adopted by members of a social system".
Social system	"A social system is defined as a set of interrelated units that are engaged in joint problem solving to accomplish a common goal".

Adapted from Rogers (2010, p.33)

Rogers (2010) described the procedure of the technology diffusion as one which is articulated by improbability decline in attitude among possible adopters throughout the institution of the innovation. Although an innovation can usually provide its adopters new customs of undertaking their routine complications, the unlikelihood as to whether the new ways will be greater to prevailing ones grants a significant complication to the process of adoption. As such, attitude is one of the key factors that may determine adoption of an innovation (Albugarni & Ahmed, 2015).

(Rogers, 1962) outlined the following attributes of an invention that reliably encourage the adoption of the innovation:

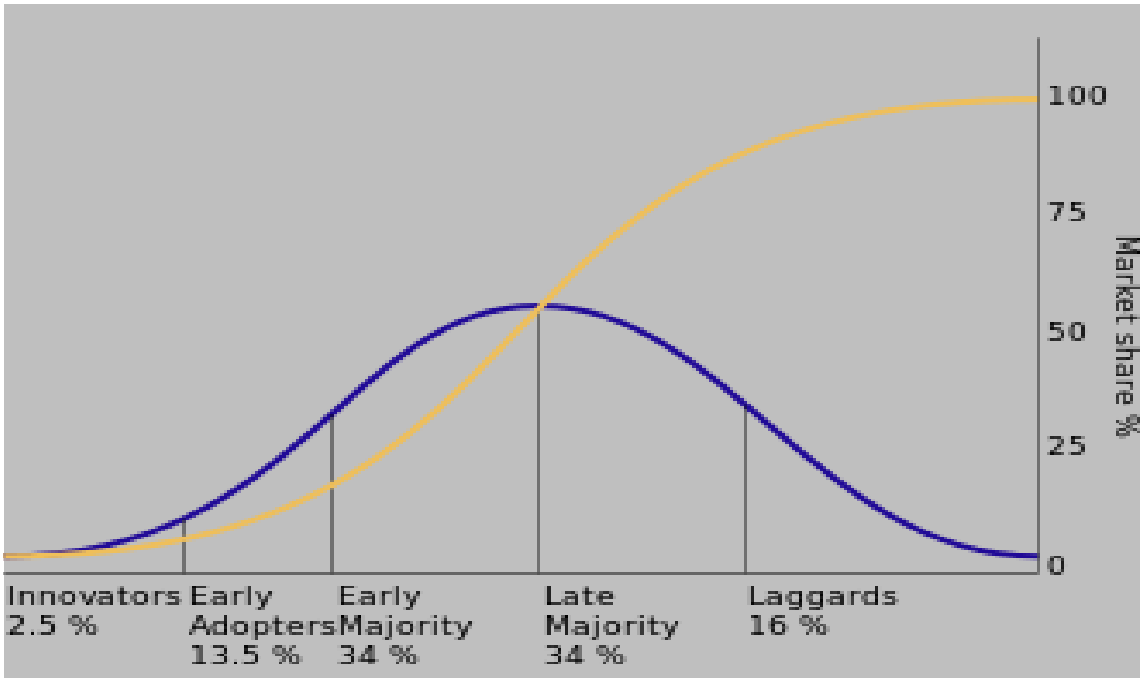
- Relative advantage
- Compatibility
- Complexity

- Observability
- Trialability

2.8.8 DOI – categories of innovativeness

Diffusion of Innovation is a model of why, what and how the rate of an innovation spreads through cultures (Rogers, 2010). People are viewed as owning diverse levels of preparedness to approve an innovation and as such, it has been witnessed that the part of the people accepting an innovation is normally spread over a period of time (Rogers, 2010). Rogers further broke down the normal distribution into segments of five individual innovativeness categories which are: innovators, early adopters, early majority, late majority and laggards.

Figure 2.5: Categories of Innovativeness



Adapted from Rogers (2010)

Rogers describes "an adopter category as a classification of individuals within a social system on the basis of innovativeness" (Rogers, 2010, p.43). Rogers went on to define these kinds of people as below:

(i) Innovators – These are the first people to accept an invention. They are prepared to take the initiative, have the utmost authority, have enough monetary sanity and have interaction to technical bases and can communicate with the other innovators.

(ii) Early adopters – These are the people that have the uppermost degree of judgment among the rest of the groups. They have a higher social status and advanced education. They have the ability to withstand any eventuality, as long as they get support from the innovators.

(iii) Early majority–The people in this class accept the technology after an unpredictable point in time. This kind of acceptance is significantly lengthier than the innovators and early adopters. They have a habit of making slow the process of adoption and sometimes hold positions of leadership opinion in an organisation. These people have less acceptance to threats since their financial status is not as that of the other groups above.

(iv) Late majority – This category consists of individuals who adopt an invention after the usual members of the society. They have a sceptical degree of approach, depending on how the majority of the society has accepted the innovation. These individuals have very little financial sanity and very little judgemental management. This category of adopters has no risk tolerance thus, always give irrelevant motives for not accepting an invention.

(v) Laggards – These are the individuals who are the last to adopt an innovation. Apart from the previous classes, people in this category show little leadership. They have hatred to change and incline to be advanced in age. Most of these individuals have a habit of focusing on customs, and are the oldest of all other adopters.

In this study, the Department of Education is viewed as the innovator because they can absorb the innovation and risk hastily and when the innovation nose-dives; they can accept the load due to their financial status. The early adopters are the leaders of the schools who find the adoption of the innovation being worth taking courage to use. The

early majority are the kinds of personnel that have set down and realised how worth the innovation is. This could be such leaders of schools who go further and tell other leaders the benefits of the innovation. The late majority are those kinds of leaders who follow others who have had experience using the technology. Laggards in relation to this work are the leaders who have a negative attitude towards the use of the technology.

2.9 Comparison of ICT adoption models

Table 2.3 below summarises the different models described above.

Table 2.3: Summary of different models

Model	To determine when to adopt	Examine Behaviour	Social Influence	Suitable to questionnaire	Adoption studies	Applies to institutions	Applies to Individuals
TRA	X	X	X		X		
TPB		X	X		X		X
TAM		X					X
UTAUT		X			X		X
DOI	X	X	X	X	X	X	

The theoretical models analysed above are appropriate for adoption studies. Nonetheless, the UTAUT, TPB and TAM apply to individuals adopting an innovation, whilst the DOI relates to institutions that intend to adopt the innovation (Oliveira & Martins, 2010). Moreover, DOI is used by institutions to decide when to accept a specific invention whereas UTAUT, TPB and TAM scrutinise a person's behaviour that eventually leads to acceptance.

Having gone through the attributes related to this study, it was found that the only model that best fit into this study is the diffusion of innovation. The other models involve particular paradigms and analytical demands that could be included in the questionnaire. Researchers such Mathonsi (2006) also used DOI to evaluate the adoption of IQMS in secondary schools in KwaZulu-Natal. Its attributes will assist to determine how ICTs have been used in the management of secondary schools in Mashishila Circuit.

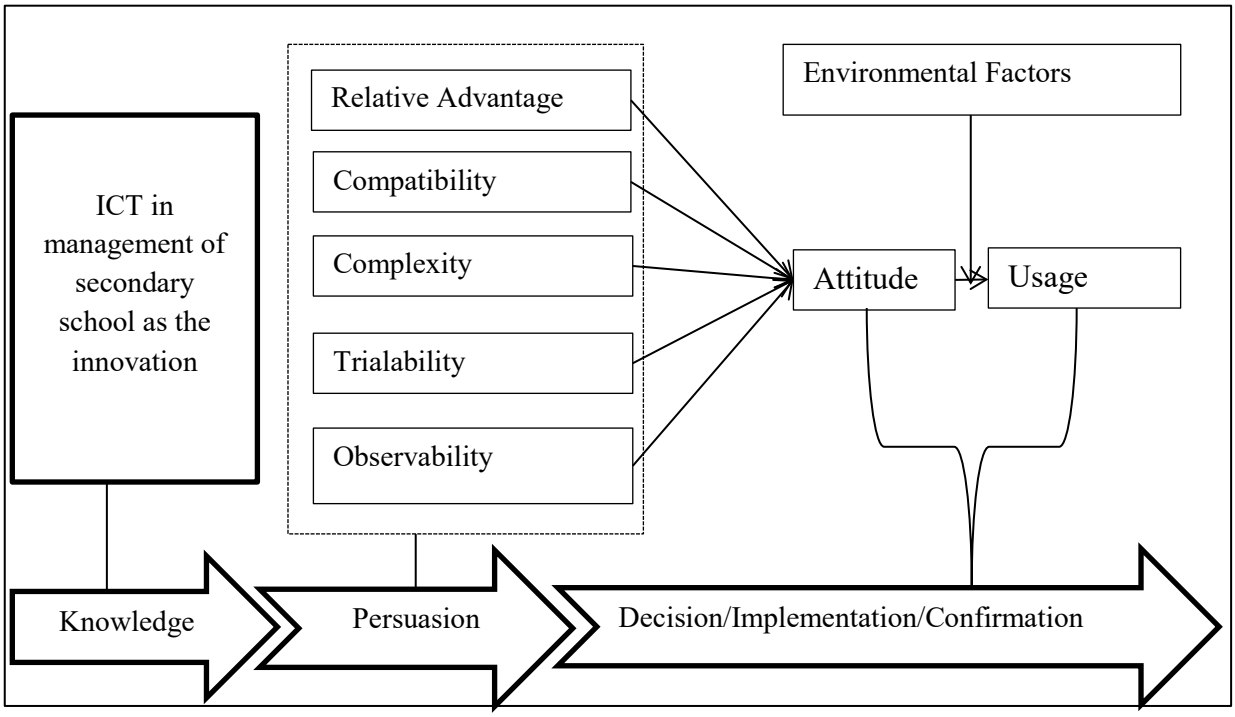
2.10 Diffusion of innovation model

Accepting how technologies diffuse in societies has been considered in numerous areas. To clarify the adoption rate of an innovation, numerous theories have been suggested, such as the Technology Acceptance Model (Davis & Venkatesh, 1996) and the Lazy User Model (Tétard & Collan, 2009). The leading and most dominant model is Everett Rogers's Diffusion of Innovations model. The Technology Acceptance Model proposes the approval of technology is subjective to perceived ease of use, perceived usefulness and subjective norm or perceived satisfaction. Rogers (2010) proposed the Diffusion of Innovation Theory, stating the ease of use; the five attributes and environmental factors influencing the individual's technology acceptance. This work used the Diffusion of Innovation Model since the other models include personal factors and no social factors are considered. The diffusion of innovation model includes the environmental factors that affect the adoption of a new technology hence, it is the best model with regards to this proposed work.

Diffusion of Innovation (DOI) Theory also known as Innovation Diffusion Theory (IDT), developed by Rogers (2010) presents one of the oldest social science theories. The model enlightens in population or social system. According to Rogers, "the idea of diffusion of innovations typically discusses the spread of philosophies from one civilization to another, or from a focus or institution within a society to other parts of that society" (Rogers, 2010, p.4). This study took ICT usage in secondary schools as the innovation. ICT as the innovation has to diffuse throughout the management of a secondary school. In many cases, leadership has to implement and facilitate the smooth adoption and dissemination of the innovation.

The theory comprises five attributes of innovation. The breakdown of the attributes is displayed in Figure 2.6**.**

Figure 2.6: The diffusion of Innovation model



Adapted from Rogers (2010)

Roger's diffusion of innovation theory consists of five attributes that persuade a user's attitude towards adoption of the innovation. In this research, the author wanted to understand the reason behind success or failure of ICT management in secondary schools. According to Celik and Yesilyurt (2013), attitude is a predisposition or a tendency to respond positively or negatively towards a certain idea, object, person or situation. As such, the study seeks to find out the attitudes of the leaders of schools towards the adoption of ICT for management. The environmental factors, as far as the management of schools using ICTs is based on the social factors, as well as the government policies in assisting in the adoption of the technology.

This study viewed ICT in management implementation as an innovation acceptance and as such, uses Roger's model which specifies that if the supposed benefit to the usage of an invention is progressive, then this implies that the chance for adoption will be

positive. The model's attributes are the features of an invention that have effect on the possibility of acceptance (McQuail & Windahl, 2015).

2.10.1 Relative advantages

Rogers describes relative advantage as "the degree to which an innovation is perceived as being better than the idea it supersedes" (Rogers, 2010, p.14). The social motivation status and the cost characteristics of inventions are fundamentals of relative advantage. Rogers branded inventions into two types: preventive and incremental (non-preventive) innovations. "A preventive innovation is a new idea that an individual adopts now in order to lower the probability of some unwanted event" (Rogers, 2010, p.15). The preventive innovations customarily have a sluggish degree of acceptance, so there is uncertainty on relative advantage (Driver, 2012). Incremental innovation provides valuable effects in a diminutive time. When administrators look at the new burdens on them, then they will implement ICT for management. If principals see that using ICTs for management adds significance in their order, then they will definitely use it. To effectively incorporate ICT for management into secondary schools, school management teams should understand the necessity of providing supportive experiences they have had and their staff in using the technology (Yadav et al., 2016). To upsurge the level of acceptance of the innovation and to make relative advantage more operational, indirect or direct financial imbursement motivations can be used to support the personalities of the community in accepting the invention.

2.10.2 Compatibility

Rogers noted that "compatibility is the degree to which an innovation is perceived as consistent with the existing values, past experiences and needs of potential adopters" (Rogers, 2010, p.17). Nonexistence of compatibility in management ICT with the needs of an organisation could undesirably disturb the entity's ICT usage. Given that an invention is compatible with the organisation's necessities, then there will be less indecision and the innovation adoption rate will upsurge.

2.10.3 Complexity

Rogers (2010) describes complexity as "the degree to which an innovation is perceived as relatively difficult to understand and use" (Rogers, 2010, p.17). Contradictory to the other characteristics, complexity is undesirably associated with the adoption rate.

Extreme complexity of an invention is a complication in its acceptance. An invention might challenge the organisational leaders with the encounter of altering their managerial approaches to incorporate the new innovation into their order (Munyantware, 2006). This proposes that if computer software and hardware are comprehensible, they might be accepted for the conveyance of successful school management.

2.10.4 Trialability

Rogers (2010) also describes trialabilty as " the degree to which an innovation may be experimented with on a limited basis" (Rogers, 2010, p.19). Trialability is related to the rate of adoption. The more you keep trying an invention, the quicker is its acceptance rate (Adukaite, Van Zyl & Cantoni, 2016). Thus, the invention could be easily altered by adopters. Improved re-innovation could produce quicker acceptance of the technology, which could be particularly supportive for future adopters. According to Rogers, earlier adopters vie trialability as more important than future adopters.

2.10.5 Observability

Rogers (2010) describes observability as "the degree to which the results of an innovation are visible to others" (Rogers, 2010, p.20). Noble observation is the significant inspirational aspect in the acceptance and dissemination of ICT in management of secondary schools (Munyantware, 2006). Parallel to knowledge, complexicity, trailability, observability, compatibility, relative advantage and observability, are also strongly related to the adoption rate of an invention (Shippee, 2016). In relation to this study, it remains to be seen if indeed the participants were being aided in adopting the innovation through observing other colleagues. However, Pandolfini, (2016) argues that there is no guarantee that a user can be drawn to adopt a technology after having observed it, because some tasks are difficult to learn from just observing.

2.10.6 Environmental factors

Hashim (2015) observed that many countries have established ICT policies. Regardless of the disposal of such policies, other countries have wriggled to devise and attain the policy objectives. The drawbacks in the South African ICT policy are mostly related to financing challenges, particularly lack of funding (Conger, 2015). The Institute for Distance Education in South Africa, also known as SAIDE, states that the lack of

appropriate policies, vigilant preparation, infrastructure and resource ability, the positivity of assimilating ICT in management of secondary schools in South Africa, will be deterred.

2.10.6.1 ICT policies in South Africa

A number of laws that provide a permitting atmosphere to admittance to ICTs in management in South Africa have been constructed. The South African Information Technology Industry Strategy (SAITIS) defines "legislation" as "a formal signal of intent on the part of government to embark on a specific course of action" (Kayisire & Wei, 2016, p.631). Kayisire and Wei further describe legislation as in this way:

> "Legislation creates predictability and certainty, conditions that are often crucial in influencing the private sector (especially foreign investors), whether and where to invest. If appropriately framed, legislation can also enhance the transparency of government action and promotes accountability by designating responsibility and providing the instruments whereby performance may be measured" (Kayisire & Wei, 2016, p.633).

The different legislative pieces that are related to ICT in the management of secondary schools in South African education system are highlighted in Table 2.4.

Table 2.4: Legislative framework on the adoption of an innovation

Legislation	Description of the Legislation
Promotion of Access to Information Act 2 of 2000 (PAIA)	PAIA seeks: • To provide result to the legitimate right of admission to any info; • To establish out reasonable boundaries on the right to use data intended at shielding public confidentiality, private commercial material and guaranteeing nominal,

	effective and upright authority; • To stabilise the right of admittance to info with all the other civil rights in the establishment; • To encourage ethos of human rights and social justice; • To create devices and measures to allow persons to attain admittance to registers as quickly, reasonably and effortlessly possible; Such an Act empowers institutions to come out with infrastructure that can be used to share information. In relations to this study, the Department of Education may come up with a hub centre where resources are shared and discussion groups established creating a conducive environment for management of schools. Such hubs maybe located at circuit level, regional level or at provincial level.
National Education Policy Act, Act No. 27 of 1996 (NEPA), as amended	NEPA provides the basic framework for the National Minister to, amongst others, determine national educational policies for the planning, provision, financing, staffing, co-ordination, management, governance, programmes, monitoring the implementation of these policies and evaluate the general well-being of the educational system (Section 4, subsections (1) to (3), National Education Policy Act, 1996). It is therefore the responsibility of the Department of Education to plan, implement and the necessary human and financial resources for the implementation of ICT in management

	of schools. In this regard, different training programs in relation to the use of ICT for management should be made available by the Department of Basic Education. The Department should be seen as the driving force with regards to the adoption and implementation of ICT for management in secondary schools. It remains to be seen if such programmes do exist in Mashishila Circuit.
South African Schools Act, No. 84 of 1996 (SASA), as amended	The South African Schools Act (SASA) (1996) promotes access, quality and democratic governance in the schooling system. SASA broadly encompasses the development of an organisational funding and governance framework for all schools in South Africa. It ensures that all learners (irrespective of colour, gender etc. and areas where they live in South Africa) have the right of access to quality education without discrimination (Moabelo & Uwizeyimana, 2013) and makes schooling compulsory for children aged 7 to 14. It provides for, among other things, the school funding norms, prioritise redress and target poverty with regards to the allocation of funds for the public school system (Department of Education, 2006, p.4). In terms of SASA funding norms, learners from poor background who attend schools that are located in high poverty areas (mostly in rural and urban slums) are allocated more funds than those schools in affluent areas (mostly

	urban areas). In order to protect the Constitutional rights of the children, most of schools located in high poverty areas, where parents and guardians are not able to afford the school fees, are now progressively becoming no-fee paying schools (Mathevula & Uwizeyimana, 2014). Since Mashishila Circuit schools are located in a remote area, this also gives the Department of Education the authority to fund these schools in terms of resources. Such resources could include the use of ICT in secondary school management.
Telecommunications Act, 103 of 1996.	This seeks to make new provision for the regulation of telecommunication activities other than broadcasting, and for the control of the radio frequency spectrum and for that purpose, to establish an independent South African telecommunications Regulatory Authority and a Universal Service Agency; to repeal the Radio Act, 1952, and the Radio Amendment Acts of 1957, 1962, 1963, 1969 and 1974 and to amend the General Law Amendments Acts of 1957 and 1975, the Post Office Service Act, 1974, the Broadcasting Act, 1976, the Legal Succession to the South African Transport Services Act, 1989, and the Independent Broadcasting Authority Act, 1993. This Act also provides for 50% discount to all public schools as defined in the South African Schools Act, 1996 (Act No. 84 of 1996) and all public further education and training

	institutions as defined in the Further Education and Training Act, no. 98 of 1998), on all telecommunication calls to an Internet service provider; and any connection as discussed in the previous sections. Such discounts could also assist secondary schools by using internet more frequently. Communication within the circuit, the region and province could be aided by the use of the internet. As discussed earlier on, use of technology in many rural schools has been hindered because of ICT infrastructure costs. Such an Act provides for such a barrier (Keengwe, 2012).
Skills Development Amendment Act, No 31 of 2003	The Act seeks to develop the skills of the South African workforce; To increase the levels of investment in education and training in the labour market and to improve the return of that investment; to encourage employers i) To use the workplace as an active learning environment; ii) To provide employees with the opportunities to acquire new skills; iii) To provide opportunities for new entrants to the labour market to gain experience, and iv) To employ persons who find it difficult to get employed. To encourage workers to participate in learnerships and other training opportunities; ensure the quality of education and training in and for the workplace; to improve the

	employment prospects of persons previously disadvantaged by unfair discrimination and to redress those disadvantaged through training and education. As discussed above, the problem is that the skills levies levied in terms of this Act are administered by the Department of Labour, while the Department of Education is responsible for providing training to the educators. This also equips the Department of Education with the necessary ICT management skills programmes to foster the use of ICT in management of secondary schools. These programmes might include professional ICT studies which the department funds in order to improve the ICT skills of educators. The Department of education can also establish formal and informal training programmes pertaining to the use of ICT in management of secondary schools.
Electronic Communications Act No. 36 of 2005	Promote the convergence in the broadcasting signal distribution and telecommunications sectors and to provide the legal framework for convergence of these sectors; to make new provision for the regulation of electronic communications services, electronic communications network services and broadcasting services; to provide for the granting of new licences and new social obligations; to provide for the continued existence of the Universal Agency and the Universal Service Fund (RSA, 2005). Such an Act facilitates the communication

	of schools via the internet. It again calls for establishment of hubs to enable communication. This could help quick conveyance of message to relevant offices in the Department of Education from schools.
State Information Technology Agency Act No. 88 of 1998	This provides for the establishment of a company that will provide information technology, information systems and related services to, or on behalf of, participating departments and with regard to these services, act as an agent of the South African Government. Since Mashishila circuit is in a remote setup, such an Act can make it possible for the schools to have strong communication infrastructures that do not impede communication through the use of ICT in management.

Adapted from Mojapelo (2014, p.23)

The determination of such laws is to permit South Africans to use ICTs to advance the superiority of lives and the South African economy in general. The researcher embraced these laws which have significance to ICTs in the management of secondary schools in this study. ICT legislation brands a substantial influence towards allowing the anticipated effects of policies such as the South African Education Policy (Roldán-Álvarez, Martín, García-Herranz & Haya, 2016). For example, as an establishment, it is the Department of Education's accountability to deliver the essential set-up and teaching for school leaders in the use of ICT in the management of secondary school (Mojapelo, 2014).

2.10.7 Adoption

To summarise the attributes, Rogers (2010) contended that inventions contributing more knowledge, relative advantage, trialability, observability and compatibility will be accepted quicker than other innovations. Rogers cautions that, "getting a new idea

adopted, even when it has obvious advantages, is difficult" (Rogers, 2010, p.38). Therefore, the existence of these attributes of inventions quickens the acceptance development. People are likely to have larger threat propensities and the higher the risk, the less the degree of acceptance of the technology. Using the diffusion of Innovation theory, Matveev (2002) discovered that where there is an improbability, misperception and sustenance difficult, an invention develops discord, composite and daunting. As such, it remains to be seen how the adoption of the innovation in these secondary schools facilitates sustainable management.

2.11 Weaknesses of diffusion of innovation model

One of the weaknesses of the diffusion of Innovation model is linear and cause subjugated. This is because it perceives communication development beginning with fact of opinion of selected few who have made a decision diffuse the technology. in that view, it underrates the influence of media (Richardson, 2011) . It only creates attentiveness of a new innovation. According to Hansen (2011), Rogers' model consigns a very essential part to diverse kinds of individuals acute to the development of the diffusion. Rogers's model merely indicates that media encourages the first people to accept the invention who encourage the leaders who then encourages everybody. He did not realise that the media can encourage group discussions that can be led by agents of change. Another setback of this model is that it motivates acceptance by individuals that may not want the technology (Anderson & Shattuck, 2012). Rogers did not comprehend that some individuals might not be the innovators type or early adopters type, but not necessarily quick to accept the technology.

The investigator is of the view that an individual may be new to the technology, adventurous, stable in terms of finance and rather hesitant in implementing a technology. After a thorough analysis of Victor and Babatunde (2014), the researcher decided that there should be no tolerance in integrating the adopters' groups. The researcher has thus noted that they may be leaders of schools who are innovators in feature and yet fail to enthusiastically implement ICT use in the management of secondary schools.

2.12 Conclusion

In this chapter, the literature and theoretical frameworks underpinning the study have been highlighted. The overabundance of works on ICT puts the use of ICT in management of schools as a foreseeable realisation (Adeyemi & Olaleye, 2010). The adoption process, however, may be hindered by many aspects which include the lack of training on the administration personnel, ICT infrastructure and unwillingness on the part of the leaders of schools, to surrender the longstanding standards of management and the undesirable assertiveness towards the use of ICTs. In various parts, ICT resources might be in existence but continue to be unused as a result of non-existence of administration capabilities. Such a setting requires that the Department of Education and its partners provide planned, synchronised and decisive managerial platforms for leaders of schools as a matter of urgency. This could be achieved by attending to ICT infrastructure and its maintenance. The expenses of ICT infrastructure and sufficient guidelines of adoption are other critical matters that require instant government consideration. In the second part, the theoretical frameworks which are related to the adoption of an innovation were presented. A comparison was made and weaknesses of the other models were also highlighted, which led to the selection of the theoretical model for this work. The diffusion of Innovation Model was chosen to be the most suitable for this work. This emanated from the fact that it puts across all social factors related to this study. The attributes of the chosen model are then explained in detail. In the next chapter, the research design and methodology are described.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

The preceding chapter offered a review of the works in relation to the use of ICTs in management of secondary schools. This chapter discusses the research methodology and design. In this section, the area under study is drawn out and followed by the selection of the population for the study. Insight on the research approaches for choosing the participants and an explanation of why such approaches were used are also given. Methods of collection of data and the research tools for this study are also elaborated, followed by the data extraction and analysis. Lastly, narratives on the literature survey, concept matrix, ethical considerations, reliability and dependability of the study, are presented.

3.2 Quantitative research methodology

The quantitative approach was used in this research and this refers to"… explaining phenomena by collecting numerical data that are analysed using mathematically based methods (in particular statistics)" (Creswell, 2013, p.42). A focused or positive idea that panels the quantifiable flair of study is constructed on the belief that a shared reality has a fair balance and that individuals' responses are representative of the unbiased scenery (Robson & McCartan, 2016). The advantages of the quantitative approach is that magnitude is binding, reliable and general in its faultless prediction of results and the source (Yin, 2013). Mertens (2014) also reckons that the use of the quantitative approach aids in obtaining significant dependability on collected data. This is achieved through the use of statistical inferences, which includes comparison of means, diagrammatic representations, etc.

According to Tight (2010), "Quantitative research is a study involving the use and analyses of numerical data using statistical techniques" (Tight, 2010, p.198). Quantitative research methodology is an arithmetic procedure that uses ratios, ranges and averages (Hussein, 2015). The motive behind the use of the quantitative research approach is that gathered data comprise figures and arithmetic evidence which can be

readable, presented in an interpretable method, for example, line graphs, tables, pie charts and bar graphs (Smith, 2015). Diagrams converse fast, reveal more, have a more influential impression, have a more long-term imprint than inscribed measurements and thus, resounding than a mere argument (McNabb, 2015).

3.3 Research design

"A research design is a step-by-step plan that guides data collection and analysis" (Goodwin & Goodwin, 2016, p.15). This research employed the quantitative research design. The case study approach was used to gather information related to the circuit under consideration. The reason behind the selection of the case study approach was that it allows an in-depth approach and produces concrete validation about what the study proposes to investigate. In this study, the case study research design was used to determine the investigation into the principals' perceptions towards ICT use in the management of Mashishila Circuit secondary schools. According to Yin (2013), a case study is "an inquiry that uses multiple sources of evidence. It investigates a contemporary phenomenon within its real life context" (Yin, 2013, p.74).

3.3.1 Study site

The study site is regarded as the environment where the research is conducted (Salkind, 2016). This research was conducted in the Mashishila Circuit, in Gert Sibande District of the Mpumalanga Province, South Africa. Most schools in this circuit are close to farms hence, they are in rural areas. All the schools included in this research are Quintile one schools, meaning that according to the Department of Basic Education, they are no fee paying schools because of their location in the rural areas (Heystek, 2011). However, there is one private school which is situated in Elukwatini location. Residents of the settlements in which the schools are located are mostly illiterate young men and women who may have either failed their matric or dropped out of school. While this is a poverty-stricken area, there are some settlements such as Nhlazatshe, Elukwatini and Lochiel, which are showing some significant signs of growth in terms of urbanisation.

3.3.2 Target population

According to Noether (2012), a target population is a collection of individual components with detailed characteristics that the researcher is interested in. Thus, a

target population is the population from which the sample is selected, (Bird, 2009). For this study, the target population entails all the schools in Mashishila Circuit in the Gert Sibande District of Mpumalanga. The Circuit consists of eleven secondary schools namely, Bantfwabetfu, Chief Jerry, Ekulindeni, Highveld, Ngilandi, Holeka, Litjelembube, Sisukumile, Takheni, PCH and Mountain View. These 11 schools involve the population from which the participants for the study were drawn. The research population therefore comprised 195 educators and office clerks. It is important to reiterate that this research mainly focuses on the SMT, which is made up of the principals, deputies, heads of departments, senior teachers and the administration clerks.

3.3.3 Sample and selection method

Jackson (2015) defines sampling method as the practice of selecting a share of the population to denote the target population in a study (Jackson, 2015, p.12). There are two types of sampling methods, which are the probability and non-probability techniques. In this case, the non-probability method was used because of its feasibility and affordability. If selected properly, the sample can demonstrate the identical features as the population. From a perspective, determining the precise characteristics of the entire population is like biting a portion of a mango: If that mango tastes delicious, then the mango is referredd to as being tasty (Rea & Parker, 2014). However, judging the mango by a simple bite may not be the right judgement because the mango might have been half rotten. As such, to get a description of the entire mango, one needs to test both parts of the mango at the same time because tasting one part is not a representation of the whole mango. In the same way, the researcher faced this dilemma in sampling for this research. The Mashishila Circuit consists of eleven secondary schools.

Secondary schools in remote areas are often not similar in terms of management, matric pass rate and funding. Schools like Highveld, Takheni and Ekulindeni do get sponsorships from the Mathematics Science and Technology Academy (MSTA), a program that was launched in 2014 with the aim to support Mathematics, Science and Technology schools. Such schools receive up to date technological equipments. Nevertheless, unemployment and poverty levels of the people in this circuit are still too high for parents to fund their children's education in these secondary schools. These schools get funding from the Department of Basic Education. Thus, in terms of resources, there is no assurance that all the schools will have the identical ICT

management difficulties. Since the schools are in a uniform set up, there is also no assurance that they would make use of ICT resources relatively the same.

This work used the purposive sampling approach, where the investigator intentionally selected issues which were suitable and appropriate to the study and fetching them to contribute in the investigation (Stake, 2013). The selection of this technique was based on the fact that it was stress-free and cheap to implement in this study. Sample size resolutions are the acts of choosing the number of interpretations to include in an arithmetic section (Emmel, 2013). Mashishila Circuit consist of 11 secondary schools and using the purposive method, all the schools were selected for the sample, as informed by the purpose of the study.

Assurance with regards to schools in rural areas having the same Information and Communication Technology management practices is not consistent. All the secondary schools could have not been using the ICT resources for management in a similar way. Research revealed that the use of ICTs in the management of schools depends on different factors, comprising motivation from the school leaders (Vanderlinde & Van Braak, 2010).

Considering the agreement by investigators that big samples are most likely to produce outcomes that are more dependable and accurate (Dörnyei & Csizér, 2012), the researcher chose to include all the secondary schools in the Mashishila circuit. By involving all the secondary schools in this circuit, it reduced the likely sample inaccuracies and investigator predispositions. The questionnaires were administered to the senior management of the schools. Each school had seven questionnaires to be answered by the senior management team. The administration clerks are often the ones who in many instances use the technology in capturing and retrieving data. From each school, the principal, the two deputy principals, the two heads of departments, a senior educator, the administration clerk, made up the sample size. This brought the sample size to 77. All schools in this circuit have two deputies hence the minimum number of the school management team is 7. The researcher arrived at this number because the school management team comprises the Principal, the deputies, head of departments, the senior educators and the administration clerks.

3.4 Data collection methods

According to Cressie (2015), “data collection refers to the gathering of information to be used in the study” (Cressie, 2015, p.16). Jackson (2015) suggests that precise approaches and procedures which are considered suitable for a particular study be recognised so that an investigator is able to arrive at binding study results. Salkind (2016) advocates that more than one approach may be used in the collection of data, relative to the specific investigation question. Such blending of collection of data approaches help with the authentication of evidence and can lead to better results (Mertler & Reinhart, 2016). This investigation used two separate kinds of data, specifically, secondary and primary data, in order to accomplish the research objectives.

Sprent and Smeeton (2016) define secondary data exploration as “second hand” examination. It is the examination of information or data that have been collected by somebody else in their own findings. For example, other researchers or Non-governmental organisations (NGOs) who, for some determination other than the one presently being deliberated (Rubin & Babbie, 2016). The sources of secondary data for this research included the World Wide Web (www), scholarly journals, technical reports, trade journals, research universities, computerised databases, library search engines and e-government documents.

Conversely, according Mertler and Reinhart (2016), primary data refers to “the data which is acquired through first-hand experience. Primary data is obtained through the direct efforts of the investigator through, interviews, direct observation and surveys” (Mertler & Reinhart, 2016, p.15). For this research, primary data were gathered from the respondents chosen from the eleven secondary schools in the Mashishila Circuit, as described under sampling in the previous section. The following sections clarify how the two data collection methods were used.

3.4.1 Questionnaire

A questionnaire is a set of questions for gathering information from individuals (O'Rourke & Hatcher, 2013). Data was gathered by means of questionnaires, initially to collect demographic particulars of the school management team, then to find out the existence of technological skills at the selected secondary schools. Questionnaires were used to determine the skills of the leaders of the schools in the use of ICT in managing

these schools. Questionnaires were used to collect information about how the use of ICT has enabled effective and efficient management of secondary schools in this circuit.

Fowler (2013) reckons that the benefits of using questionnaires in collection of data comprise the facts that they produce a number of numerical data and such a technique is cheap (Fowler, 2013, p.12). The components of the questionnaires are relatively stress-free to mark since they are consistent. Conversely, although a questionnaire has advantages, there are also drawbacks that the investigator should take into account so that there is increased rationality. The main obstacle is that the research may be delayed because respondents take time to respond. To cub this, the investigator had to appeal to the participants to make some efforts to answer the questionnaire within a week after receiving the questionnaires. The researcher further reminded the respondents the necessity to answer the questionnaire in time in order to circumvent the research process. One of the disadvantages of using a questionnaire is that it prevents probing to get additional elucidation from the participants (Petrie & Sabin, 2013). To minimise this problem, the researcher made sure that the questionnaire covered all characteristics of the research questions. Another layback for questionnaires is that they can only be filled by learned individuals. Regarding this point, this had no influence on this work because all teachers in a secondary school are regarded as literate. Lastly, the point that questionnaires are related with very low response rate has been dealt with by encouraging the participants about the significance of their contribution.

3.4.2 Administration of the questionnaire

Neuman and Robson (2014) deliberate that, "questionnaire can be administered by telephone, mail, using face-to-face interviews, electronically or as hand-outs" (Neuman & Robson, 2014, p.55). The questionnaire was constructed from the attributes of the chosen theoretical model. After enough consideration with regards to all the qualities of the diverse means of administering the questionnaires, the investigator chose to hand-deliver the questionnaires to all the participants in the eleven secondary schools in Mashishila Circuit. Hand-delivering the questionnaires to the participants helped the researcher to converse the determination of the questionnaires as well as how the researcher deliberates on using the data. This also would increase the probability of attaining good response rate.

After receiving the applicable approvals from the Mashishila Circuit manager for the secondary school principals and the signed agreement forms for the respondents, the investigator went to the secondary schools to hand-deliver the questionnaires to every participant. This prohibited likely interruptions ensuing as a result of posting questionnaires and this facilitated a worthy rapport with the participants. Moreover, since the investigator is a secondary school educator, this individual conversation was valued by the participants.

3.4.3 Questionnaire sections

The research questionnaire was divided into four sections. These sections are:

- Biographical Information about the respondents
- degree of skills possession by senior managers of secondary schools for using technology in management of the schools
- the use of ICT in secondary school management
- The contribution of ICTs to the effectiveness of management in secondary schools

3.5 Data extraction and analysis

Data analysis is a process by which wisdom is acquired from the gathered data and it involves examining the raw, data with the objective to draw conclusions from the gathered data (Ghauri & Grønhaug, 2005). Data analysis was built on the nature of the data gathered. The data gathered from the questionnaires were converted into Excel spreadsheet form to enable easy capturing. After capturing of data, the response template was then sent to the statistician for analysis using the Statistical Package for the Social Sciences. In order to analyse the gathered data, a statistical software programme namely the Statistical Package for the Social Sciences (SPSS) was used. The investigator used numerous techniques, *viz a viz*. graphs and tables, to present the findings of the primary data gathered. Lastly, secondary data were analysed through comprehensive critical assessment of the existing literature on ICT use in management. This research analysis was based on the following statistical tests:

Descriptive statistics: Usually this test is used to define the elementary types of the data in a research (Peck & Devore, 2011). They assist in summaries concerning the measures about a sample. The simple graphical presentations and measures of central tendency help in inferring about the quantitative analysis of research data (Vogt & Johnson, 2011).

Chi-square goodness-of-fit-test: This is a univariate test which is used on a categorical variable to assess whether the response choices were significant more or less often that the others (Lani, 2011). If a result is significant ($p<.05$), look at the value of the mean (top table). If it is <3 there is significant disagreement and if mean > 3 there is significant agreement.

Note: in SPSS, a p-value of .000 is reported as $p<.0005$ (it is very small). A p value of e.g. .017 is reported as $p=.017$.

3.6 Literature survey

The secondary data collection was founded on the literature review dicussed in chapter 2. According to Bryman (2015), the literature review contains a detailed assessment of the current research. In this research, the literature review discussed Information Communication and Technology use in the management of secondary schools. This research's literature comprised published journals, newspapers articles and dissertations. Below is part of the concept matrix for this research.

3.7 Concept matrix

Klopper and Lubbe (2011) define a concept matrix as an instrument that may be used to deliver adhesion, consistency and conclusion in an investigation. Additionally, it is used to classify the literature review and permits the investigator to critically review the literature under each notion (Klopper & Lubbe, 2011). This reinforces the significance of the study (Klopper & Lubbe, 2011).

The concept matrix contains columns that denote conceptions. Each idea is pulled from the research objectives (Klopper & Lubbe, 2011). The rows in the matrix characterize

works that have been covered from the collected works. The references are revealed using the Harvard style (Klopper & Lubbe, 2011). A 1 is placed in an appropriate column if a particular reference discusses a concept (Klopper & Lubbe, 2011). This work used the concept matrix to confirm that the literature review is affiliated to the research. For the full concept matrix, Addendum 1 provides the details. A sample of the concept matrix is described in Table 3.1.

Table 3.1: The concept matrix

Reference	School Administration	ICT adoption	Change Management	Advantages of Schools Management adoption of ICT	Barriers at School level	Total
Abdillah (2014)	**1**		**1**			**2**
Adeyemi and Olaleye (2010)	**1**					**1**
Adomi and Kpangban (2010)	**1**					**1**
Alkhawaldeh and Menchaca (2014)	**1**			**1**	**1**	**3**
Biagi and Loi (2013)			**1**	**1**		**2**
Boadu (2014)		**1**	**1**	**1**		**3**

Adopted from Klopper & Lubbe, (2011).

3.8 Rationality and dependability

According to Bryman (2015), " the two most important and fundamental characteristics of any measurement procedure are reliability and validity" (Bryman, 2015, p.62). According to French (2013), rationality refers to " the grade of correspondence between the clarifications of the phenomena and the truths of the world, while dependability deals with the reproduction of the outcomes" (French,2013, p.16). Measures to

guarantee the rationality of the investigation tools comprised directing the questionnaire to a few educators in schools, in order to determine if the phrasing of the questionnaire was correct, thereby eluding misperception. Recommendations gathered from these educators were used to increase clarity on the answers. According to Zyphur and Oswald (2013), reliability is defined as " the extent to which a questionnaire, test, observation or any measurement procedure, produces the same results on repeated trials. In short, it is the stability or consistency of scores over time or across raters " (Zyphur & Oswald, 2013, p.15). Zyphur and Oswald (2013) went on to state that it is imperative to " keep in mind that reliability pertains to scores, not people" (Zyphur & Oswald, 2013, p.29). As such, in this work, there is no guarantee that someone was reliable. For this research, the investigator was mindful of the rationality that the outcomes might have been pretentious by the fact that the data were gathered from the school management team. Questionnaires also have the threat of participants not being able to express the truth, but rather give the researcher what he or she wants to hear. In order to minimise these effects, the researcher encouraged respondents to be truthful of their answers. Nevertheless, since this investigation was conducted in Mashishila Circuit secondary schools in Mpumalanga, the outcomes of the study cannot be universal to the entire Mpumalanga Province, or South Africa in general.

3.9 Ethical considerations

According to McMillan and Schumacher (2014), ethics is a phenomenon related to principles; in an investigation, some ethical procedures assist as the norms which form the foundation for assessing the behaviour of the investigator. According to Neuman and Robson (2014), ethics in an investigation refer to the standards for behaviour that differentiate between tolerable and intolerable conduct of the investigator. This work was conducted with honesty, trustworthiness and faithfulness. The Ethics Committee of the University of KwaZulu-Natal granted the ethical approval letter for the study to commence. The senior managers of the secondary schools in the Mashishila Circuit volunteered to participate by signing written consent forms before the start of the data collection process. The consent form also indicated that whatever was asked in the questionnaire would remain confidential. The investigator also guaranteed the confidentiality of and obscurity of the respondents, over and above the confidentiality of the data, in a liable way and according to the ethical recommendations of educational

investigation. Additionally, the investigator reminded respondents about their right to pull out from taking part in the research at any time, without any negative repercussions.

3.10 Limitations of the study

Limitations of the study can be attributed to factors the investigator met carrying out the research. To begin with, the area of study was small, as it was limited to the Mashishila Circuit and therefore, cannot be generalised to the whole province or country. Despite this, the investigator believed in the findings and that this is relevant to most schools in the Gert Sibande District and in particular, the Mpumalanga Province in general.

3.11 Conclusion

This chapter defined the research methodology and that were used in this investigation. The reasons underpinning the choice of the methods used were also presented. The following issues were described: the design of the questionnaire, methods of data collection, as well as data extraction and analysis. Lastly, narratives on the literature survey, concept matrix, ethical considerations, limitations of the study, reliability and dependability of the study were presented. The chapter that follows presents the findings from this research.

CHAPTER 4

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

The preceding chapter presented the research design and methodology, the sampling methods used, as well as the capturing and analysis of the data. This chapter reflects on the findings of the investigation described in the preceding chapters. The first part of this chapter describes the biographical information about the respondents. The other parts of the chapter describe each research objective with the results presented to it. Below is the specific data analysis, based on the study's objectives.

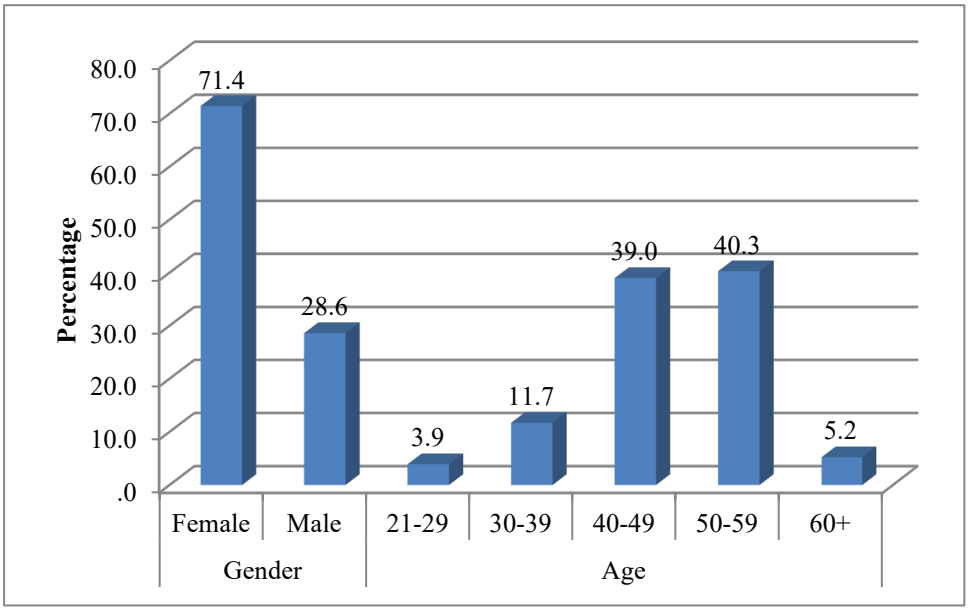
4.2 Respondents' demographics

Out of the 77 participants who were chosen to participate in this study, 53 were females and 22 were males. 2 of the participants could not specify their genders on the questionnaire that was distributed for data collection. In terms of race, the entire respondents were black. All the respondents returned the questionnaires. 77 completed questionnaires were returned to the researcher, giving a response rate of 100 percent. With regards to age, the bulk (39%) of the participants were aged between 40 and 49, 15.6% were below 40 years of age while 45.5% were exceeding 50 years of age. There were 14.3% response from principals, 28.6% from the deputy principals, 28.6% from the heads of departments; 14.3 % from senior educators and 14.3% from administration clerks. Questionnaires were collected from all the 77 respondents who participated in the study. This comprised 11 senior teachers, 22 heads of departments, 22 deputy principals and 11 principals, all from the 11 secondary schools in the Mashishila Circuit. Twenty-two (28.6%) of the respondents were males and fifty-five (71.4%) of the respondents were females.

The majority (40.3%) of respondents were between 50 and 59 years old. Since the majority (74.5%) of respondents were older than 40 years old, this is a clear sign that the bulk of the participants had numerous years in the teaching field. This age range may have negative effect on the participants' capability of using ICT for management. It has been noted that "young people of today are undoubtedly growing up in a

technological environment" (Mathevula & Uwizeyimana, 2014, p. 24). Studies conducted by Kolodinsky et al. (2004) and Castells (2015) indicate greater use of internet amongst the younger people than amongst the older ones. Figure 4.1 represents the ranges of the respondents.

Figure 4.1: Age range of the respondents



The findings from this survey indicated that in the Department of Education and particularly in the Mashishila Circuit, there are more females in the school management team than males. This could be due to the sampling method used, since most clerks are females. The youngest participants were between 21 and 29 years (3.9%), whilst the oldest (40.3%) were between 50 to 59 years. A considerable number of the SMT members were between the ages of 40 to 59. This age range could also have a negative impact on the ability to use ICT in management because the older the people, the less likely they are to have the aptitude to practice ICT in management. While "young people of today are undoubtedly growing up in a technological environment this was not the case for their parents or most people who did their primary and high school levels prior to the mid-1990's" (Mpinganjira & Mbango, 2013, p.39). Thus, it is not shocking that many studies, for instance, Hogarth, Hilgert, & Kolodinsky (2004) indicate greater practice of technological gadgets amongst younger societies than the older ones (Jabin, 2016). In this study 15.6% (11.7% and 3.9%) of the participants were less than 40 years old, while 84.4% of the participants were above 40 years, indicating

an aging school management team in the Mashishila Circuit. It also indicates that very few young educators were among the school management teams in this circuit. This could explain why most of the participants were not using ICT to carry out their managerial duties.

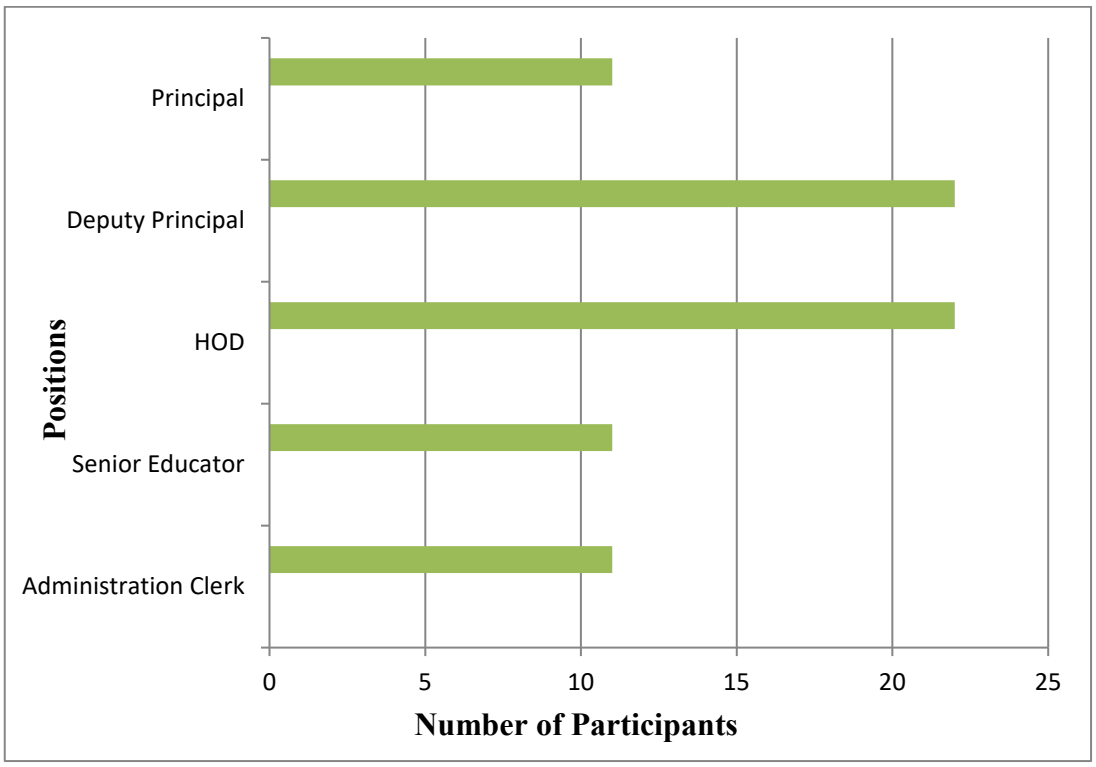
4.3 Educational background of the respondents

This section outlines the statistics regarding the position of the respondents in their different schools, the number of years that they have served in the school, as well as well as their highest level of education. The results of each of these are presented below.

4.3.1 Respondents' designation

The participants of the research were asked to indicate their positions within their schools. The results for this question are presented in Figure 4.2.

Figure 4.2: Positions of respondents

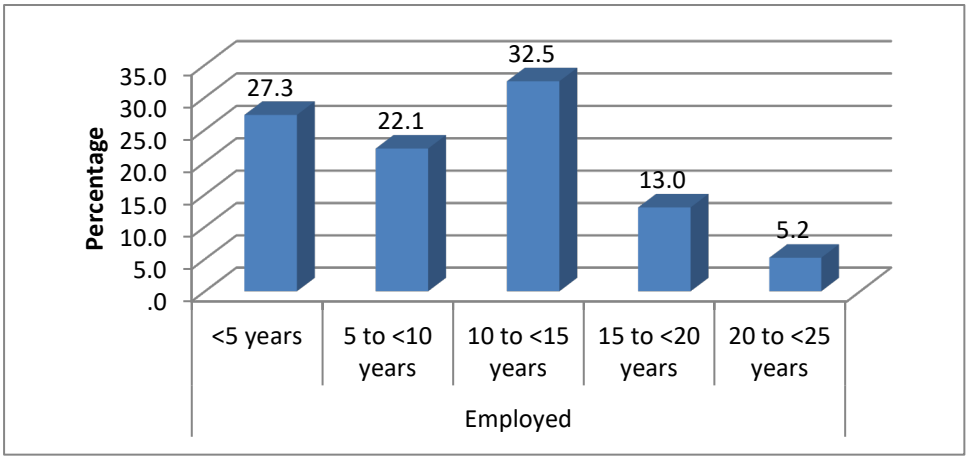


A large number of the participants were deputy principals and heads of departments. The other SMT members had the same number of participants.

4.3.2 Number of years in the school

The participants were also asked about the number of years that they had served in their schools. The findings from this question are represented in Figure 4.3.

Figure 4.3: Number of years in the schools

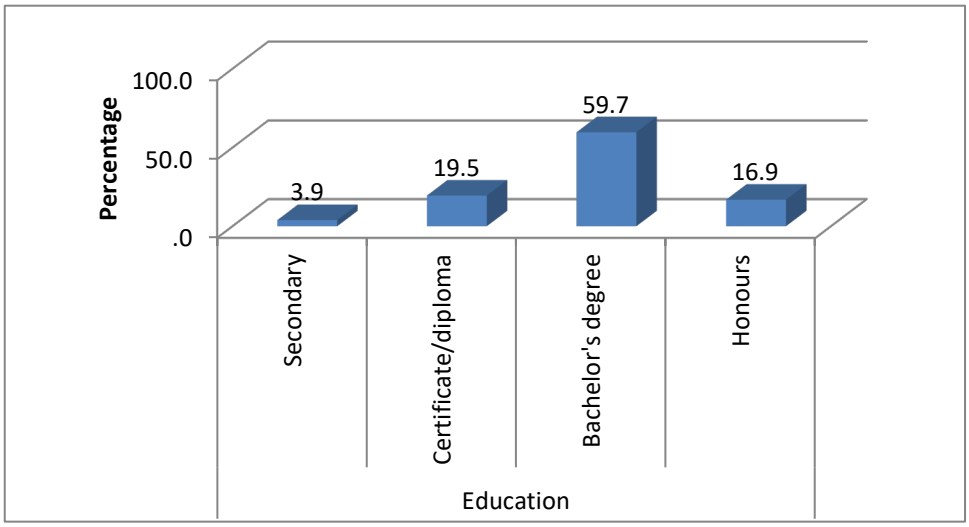


A significant number of the SMT members indicated that they had between 10 to 15 years in their schools. This indicates that most of them had experience in the running of schools. A small number of the participants had between 20 and 24 years.

4.3.3 Respondents' highest level of education

The respondents were asked about their highest level of education. The results are indicated below.

Figure 4.4: Respondents highest level of education



From Figure 4.4 above, the majority of the SMT members had Bachelor's degrees as their highest level of education. This was then followed by those with Certificates/Diplomas. As such, Mashishila circuit comprises learned people who could easily adapt to any innovation, provided they are given the necessary support.

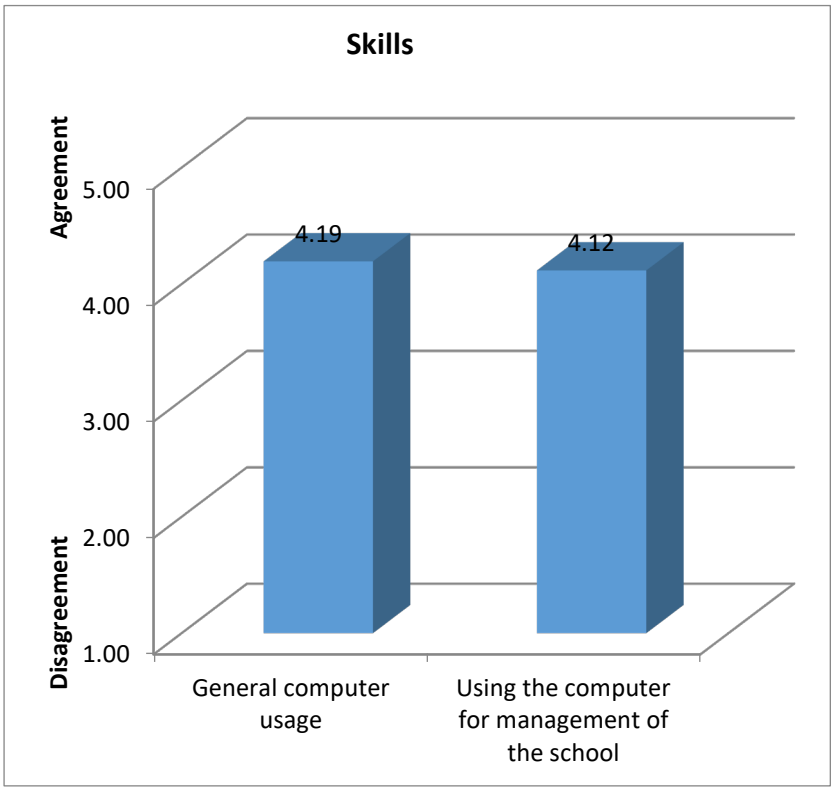
4.4 Levels of technological skills possessed by the SMT

In order to find out about the level of skills possessed by the senior managers of the schools, the following statements were proposed by the researcher.

- Using the computer for the management of the school
- Do you have any professional ICT qualifications?
- Frequency of computer use in Microsoft Word, Excel, PowerPoint, internet, document storage

In order to find out the level of computer skills possessed by the management, the participants answered up to 6 items in the questionnaire, indicating their responses as No skill = 1, Poor = 2, Average =3, Good = 4, Excellent = 5, to demonstrate the degree of skill mastery in ICT tasks. The figure below indicates the level of skills from the survey.

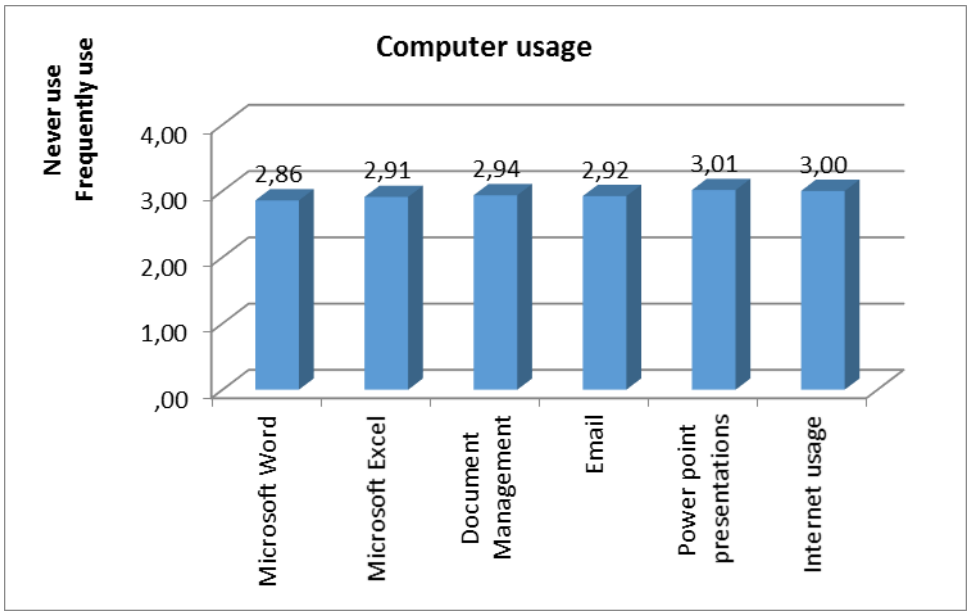
Figure 4.5: Skills competency in computer use



According to the tests of means, there is significant evidence to claim that in all the schools, the participants had skills in using computers for management, as evidenced by the mean, which is more than 3. The investigator understood that general computer usage skill could increase the use of ICT for management at work. It is very significant for school leaders to continuously familiarise themselves and acquire new skills, so as to maintain relevance in their job. To support this, Lo *et al.,* (2015) in their study, discovered that the more school leaders practiced computers, the more they got skills of proficiency in carrying their duties. The findings of this study also agree with Lo *et al*, since most of the school leaders with computer skills were practising ICT for management. Conversely, a small number did not have the computer skills. This considerable small number again was almost the same as those who did not use ICT for management. The underlying reason could be because of the aging group of the SMT members, who were "conservative" and do not want to practise ICT for management.

The investigator also wanted to find out whether the schools who received ICT resources actually improved their managerial skills. The findings indicated that none had professional ICT qualifications. These findings were disappointing, meaning that the Department of Education is doing less to support these leaders in the adoption of the technology. This means that the leaders of schools are accomplishing their duties through observing others using ICT for management, or by self-discovery methods. Ofili (2014) opined that regardless of the availability of technology in the world, there is no investment in the leaders of schools to equip them with the skills and therefore, investment in the technology is a waste of time and resources. This corresponds to the finding in those participants who did not indicate that they had any ICT skills and at the same time did not practice ICT for management. The researcher wanted to find out how the use of Microsoft packages, email and document management had aided in their skills to use ICT for management.

Figure 4.6: Frequency of computer use



From the results above it can be seen that the SMT members were indeed using their ICT skills in the Microsoft packages, in carrying out their managerial duties. As shown in Figure 4.6, the mean score of the respondents' computer use was above average. It appears that basic computer operation skills have not been the major problem, considering that none of the leaders from the selected schools had professional ICT training. Moreover, these findings are contradictory to the findings by Ofili (2014),who

suggested that without ICT skills, leaders struggle with the use of the innovation. Conversely, the comparative little ability of leaders of schools in generating spreadsheets is important since the interpretation of data is progressively becoming a precarious ability.

4.4.1 Summary

The findings from the study on the computer skills of the SMT members are both positive and negative. Positive in the sense that although all of the participants had no professional ICT skills, they were practising ICT for management. They acquired ICT skills through discovery methods or by mere observation of others who were practising ICT for management. Conversely, the lack of ICT professional skills on the part of the SMT members meant that less effort was being put by the Department of Education to improve its employees. The department is supposed to take the lead in bringing several professional ICT skills to schools to support educators in the use of the technology. This could be empowered by the Skills Development Amendment Act (31 of 2003). However it is encouraging to note that most schools were using the Microsoft packages in carrying out their day to day duties.

4.5 The use of ICT in the management of schools in Mashishila Circuit

This section of the question was aimed at validating how ICT for management was being used in secondary schools within the Mashishila Circuit. To find out about these results, the questionnaire was subdivided into sections of usage aided by the Diffusion of Innovation Model. These sub sections were:

- Relative Advantage
- Compatibility
- Complexity
- Trialability
- Observability
- Attitude
- User intention
- Environmental Factors

Out of these eight attributes that determine the usage of ICT in management, there were two attributes that have had strongly agree, making it impossible for analysis. These attributes are compatibility and complexity. Thus, these two attributes are not dealt with in this research. The following section is the analysis of the use of ICT in management.

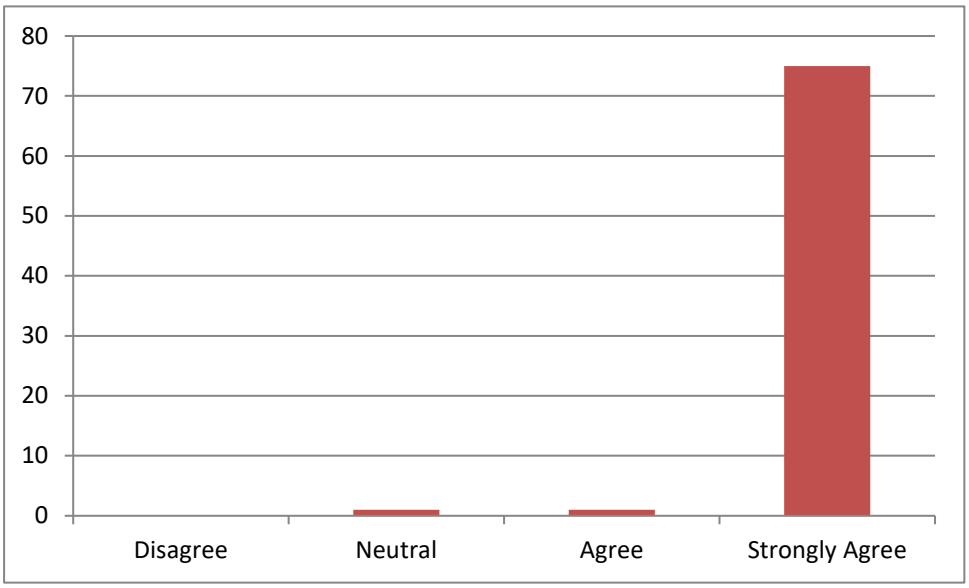
4.5.1 Relative advantage

This section dwelt on the questions that have positive leverage in ICT usage. These questions included:

- ICT for management increases my competence as a leader
- Using ICT for management improves the presentation of my work
- Using ICT for management decreases operational costs
- By using ICT for management, I have gained competency in my daily activities
- Using ICT for management has made me more effective in carrying out my daily duties
- Using ICT for management improves the quality of my work, in general

In this subsection, the first question was on the use of ICT in increasing the competence as a leader in the respective schools. The findings of this question are outlined next.

Figure 4.7: ICT for management increases my competence as a leader

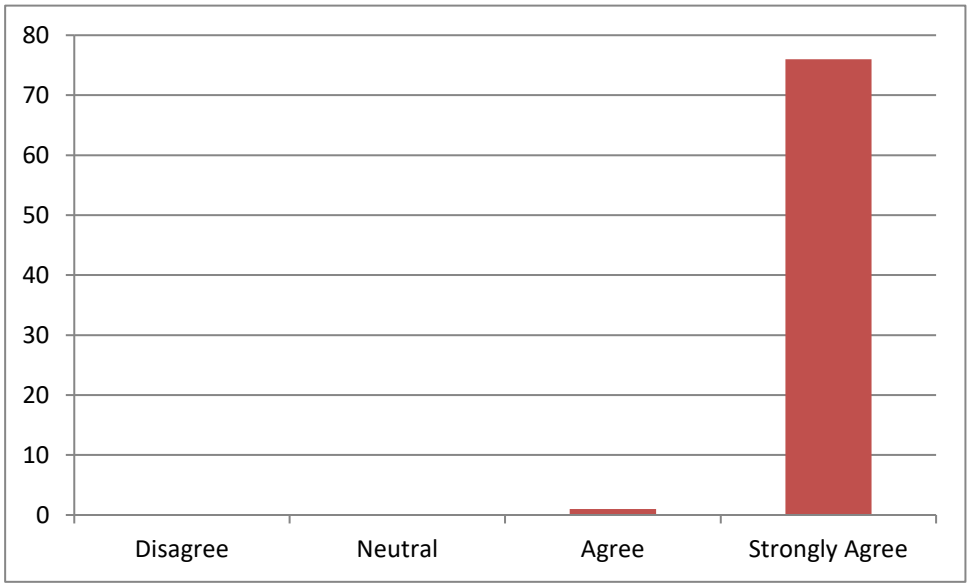


Collected work in Chapter 2 showed that using ICT for management increases competence as a leader. The researcher wanted to find out if the leaders of the participating secondary schools also believed that using ICT for management increases their competence as leaders of these schools. The results showed that 98.7% of the participants agreed or strongly agreed that using ICT for management increased their competence in management. 1.3% of the participants were not sure of the statement, indicating that they believed that using ICT for management had neither increased nor decreased their competence in the management of secondary schools. These findings, nevertheless, showed a significant level of satisfaction on the part of the use of ICT in management as having increased the competence of these leaders of schools. Figure 4.7 recapitulates the opinions of the participants on the use of ICT in the management of secondary schools.

- **Using ICT for management improves the presentation of my work**

The findings of this statement are presented in Figure 4.8.

Figure 4.8: Using ICT for management improves the presentation of my work



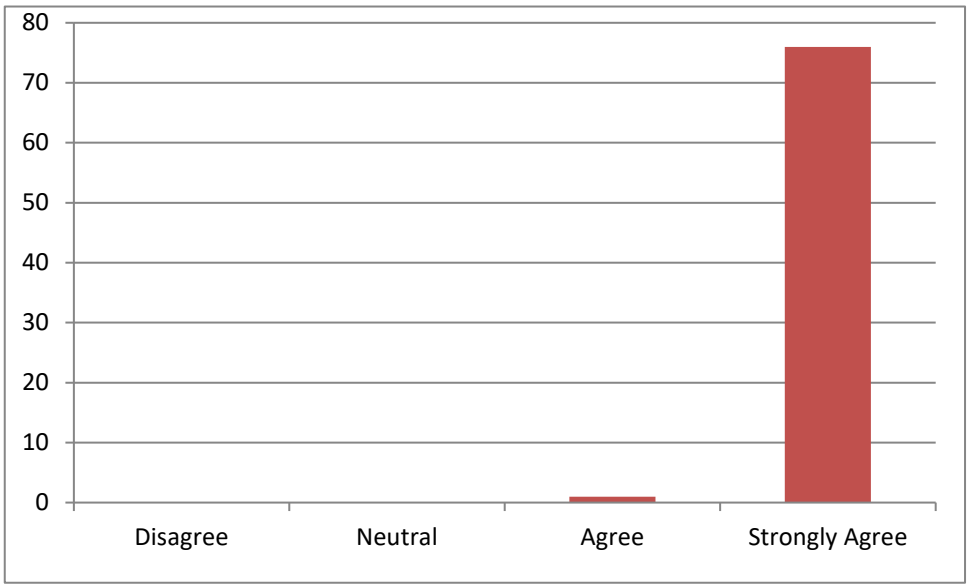
The researcher wanted to find out how managerial duties were being improved by the use of ICT for management. The findings from the survey showed that (100%) all of the participants used the ICT resources in presenting their work. This is a positive finding because at least the management is able to use ICT to do managerial activities. School

record keeping is all about information collection, storage, retrieval, use, transmission, manipulation and dissemination, for the purpose of enriching communication, decision-making and problem-solving ability in the school system. It is therefore necessary that this process be as accurate and accessible as possible. Using ICT in keeping school records would help to facilitate and enhance the administration of the school towards achieving the goals of secondary education.

- **Using ICT for management decreases operational costs**

The third question pertained to the use of ICT in management as decreasing operational cost. The results to this analysis are presented in Figure 4.9.

Figure 4.9: Using ICT for management decreases operational costs



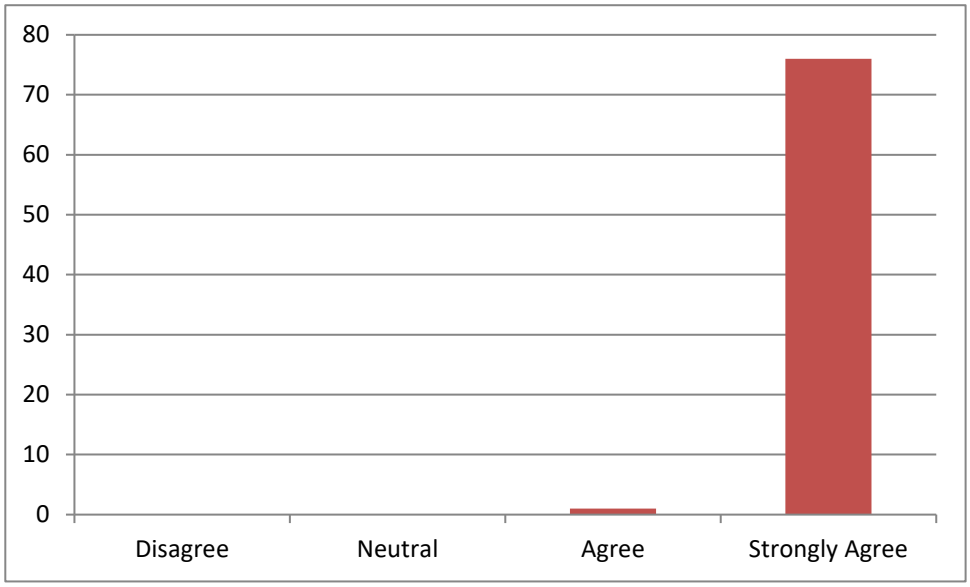
Findings on this question indicated that all of the participants agreed that using ICT for management decreases operational cost. Although all of them agreed, this could be due to the fact that they were basing on the ease that computers bring when having work done. Even though advancing the use of ICT can be cost-effective, together with the constant decrease in ICT expenses, the total cost of owning ICT infrastructure comprising hardware, software, maintenance, development and upgrading remains high (Mshanga, 2014). Ebere (2016) contends that expenditures for the procurement and repairs of ICT infrastructure are a great task that has unrelenting impact on the implementation and adoption of ICT in the management of secondary schools. In the long run, it is a matter of whether the cost added by executing ICT balances the total

amount, comparative to the cost of substitutes. As such, participants who responded positively might not have compared the cost of buying and maintaining the infrastructure as opposed to the ease of work it produces.

- **By using ICT for management, I have gained competency in my daily activities**

The fourth question was meant to infer whether the use of ICT for management have had an impact on their competency in their daily activities. The results of this analysis are presented in Figure 4.10.

Figure 4.10: By Using ICT for management, I have gained competency in my daily activities

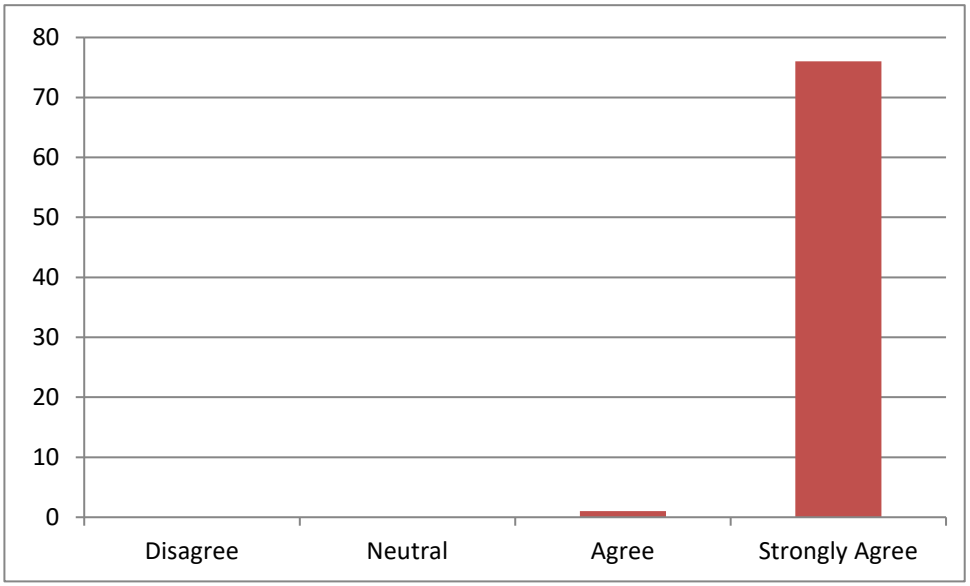


Again, the findings indicated that all of the participants agreed that by using technology for management, the leaders of the schools are gaining competency in their daily activities. This could be due to the fast way in which computers process information ready for use. This is supported by Yadav *et al*. (2016) who argues that top leaders comprehend the supremacy of ICT tools for the attainment of managerial targets and objectives. The use of ICT in management not only fulfils distinct institutional goals, but rather augments the working processes as well.

- **Using ICT for management has made me more effective in carrying out my daily duties**

The fifth question in this subsection pertained to how the use of ICT has had impact on the effectiveness of carrying out the daily duties by the SMT members. The results to this analysis are presented in Figure 4.11.

Figure 4.11: Using ICT for management has made me more effective in carrying out my daily duties

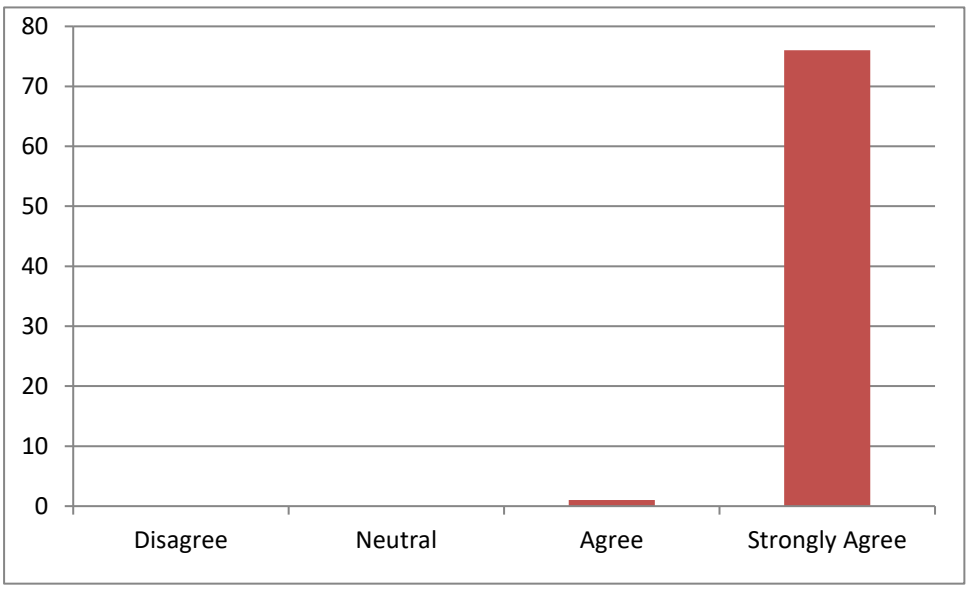


The results presented above indicate that all of the SMT members interviewed agreed that the use of ICT made them effective in carrying out their day to day duties. The findings indicate that the participants were benefiting from using ICT for management and administration, mostly because documents can be re-organised, modified and shared more easily. To support these findings, Mokgadi (2015) argues that the use of ICT made employees to be more efficient and effective in data handling, retrieving,, reduction of workload and improving the presentation and quality of their work.

- **Using ICT for management improves the quality of my work, in general**

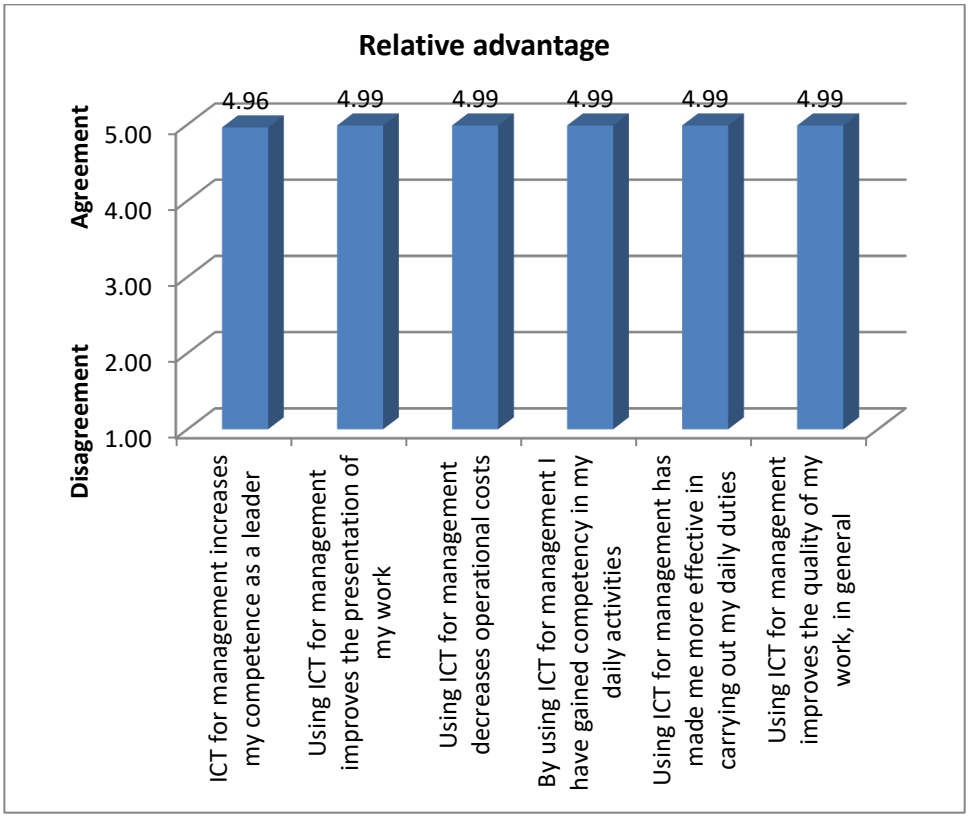
The last question in this category was with regards to the improvement of the quality of work in general, through the use of ICT for management. The findings of this analysis are presented in Figure 4.12:

Figure 4.12: Using ICT for management improves the quality of my work, in general



The findings presented in Figure 4.12 above indicate that all of the participants agreed that using technology indeed improves the quality of their work. To summarize the relative advantage towards the usability of the innovation, tests based on the mean as the measure of central tendency and the t- test were conducted. (For further details, refer to Addendum 2). Since the mean score of all the questions is above 3, there is significant evidence that the use of ICT in the management of secondary schools has a positive effect towards the quality of work it produces. To support this, the results of a one sample t-test are also presented. (For further details, see Addendum 2).

Figure 4.13: Relative advantage results

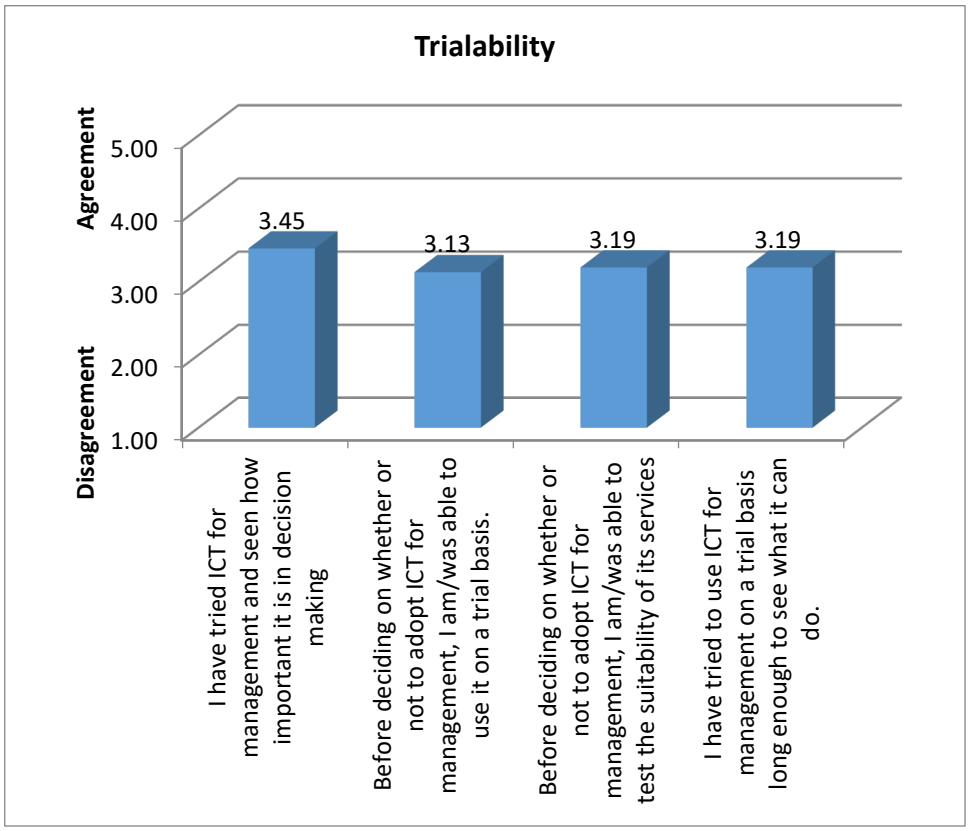


Since the t (76) = 67.888, p<.0005 in all the questions, there is indeed significant evidence that the use of ICT for management has a relative advantage in the management of schools. The graph above further indicates the analysis, with regards to each question.

4.5.2 Trialability

This sub section looked at whether the Department of Education gave the schools the trial period to test the use of ICT for management. The findings are presented in Figure 4.14.

Figure 4.14: Trialability results



The responses to all the questions indicate means that are above 3. This means that there is significant evidence that most of the members had seen how important the use of ICT for management was. The investigator wanted to find out whether the SMT members had tried using ICT for management and seen how important it is in decision making. The results indicated that most of the respondents who had tried using ICT for management had seen how important it is in decision-making. However, the other participants who stated that they did not have trial periods on the use of the technology might have had varied reasons. It may be probable that even those SMT members who did not have a trial period had no ICT equipment at their schools, or were not encouraged to use it by the department. Lastly, those who gave negative responses pertaining trialability of the innovation could have been due to the lack of training programs for the use of ICT in management. According to Adukaite *et al.* (2016), leaders of organizations need to train their employees in the use of the innovation, in order for them to appreciate its value. At present, there is no specific systematic research on the training of school managers in the use of ICT for the management of secondary schools in South Africa.

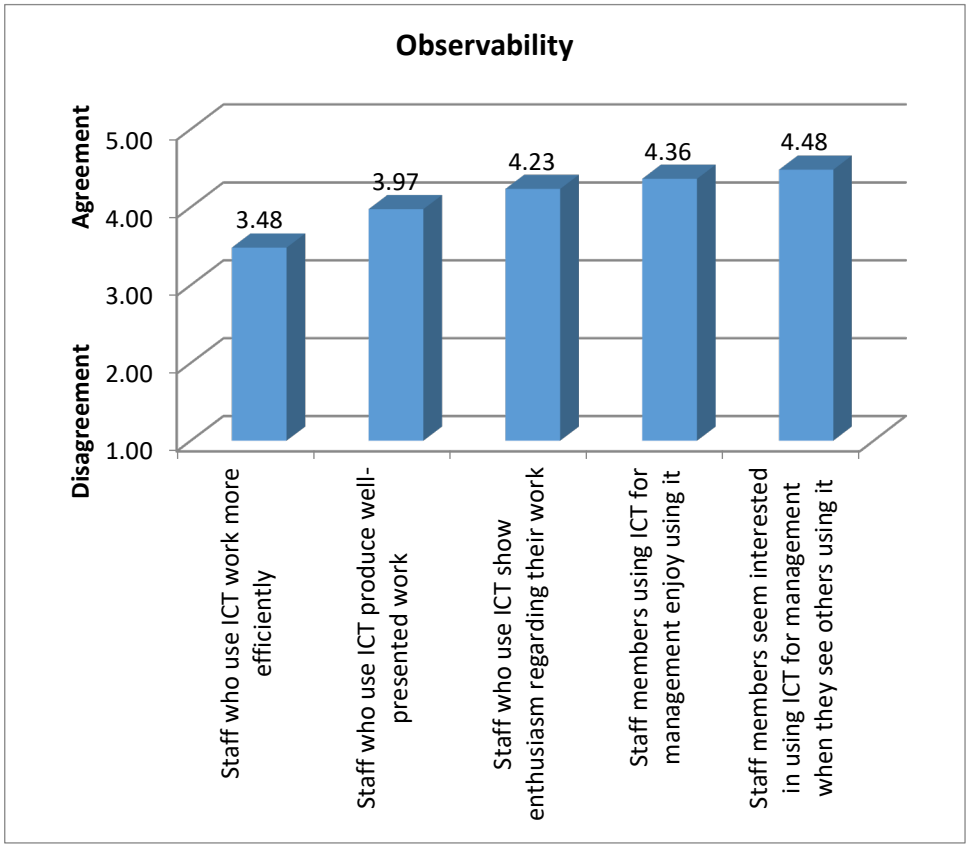
4.5.3 Observability

In this subsection, the SMT members were asked questions regarding how they had observed the use of ICT in management. The lists of the statements are:

- Staff who use ICT work more efficiently
- Staff who use ICT produce well-presented work
- Staff who use ICT show enthusiasm regarding their work
- Staff members using ICT for management enjoy using it
- Staff members seem interested in using ICT for management when they see others using it

A test of the means was conducted on the above questions, in order to check the deviations of the means. This was through the central tendency measure, as well as the t-test. The results are presented in Figure 4.14.

Figure 4.15: Results on observability



Using the measure of central tendency, the mean values were more than 3, indicating that there is enough evidence to claim that SMT members observed that using ICT for management helped ease their work. The researcher sought to find out the encouragement of the use of ICT for management by observing, through communication, demonstration or describing on ICT adoption by other leaders from other schools as having a positive impact on the respondents' work. The findings showed a positive relationship between observing ICT use and practicing it in the management of schools. These findings are consistent with the theory which describes observability as the degree to which the effects of an invention are noticeable, as witnessed by fellows of a collective structure, is certainly correlated to the adoption rate (Shippee, 2016). However, for the other respondents who gave negative responses, one probable reason for the finding could be the lack of conceptualization, since some inventions are challenging to observe (Pandolfini, 2016). In the Mashishila context, the leaders of schools should not have to first see "miracles" achieved by the use of ICT in management in other places in order to adopt it. The leaders of the selected schools should not dwell on the past which is vastly filled with failures in ICT. Nevertheless, these schools should have visions for ICT for management, since failures in the past ICT are not a hindrance in this knowledge era.

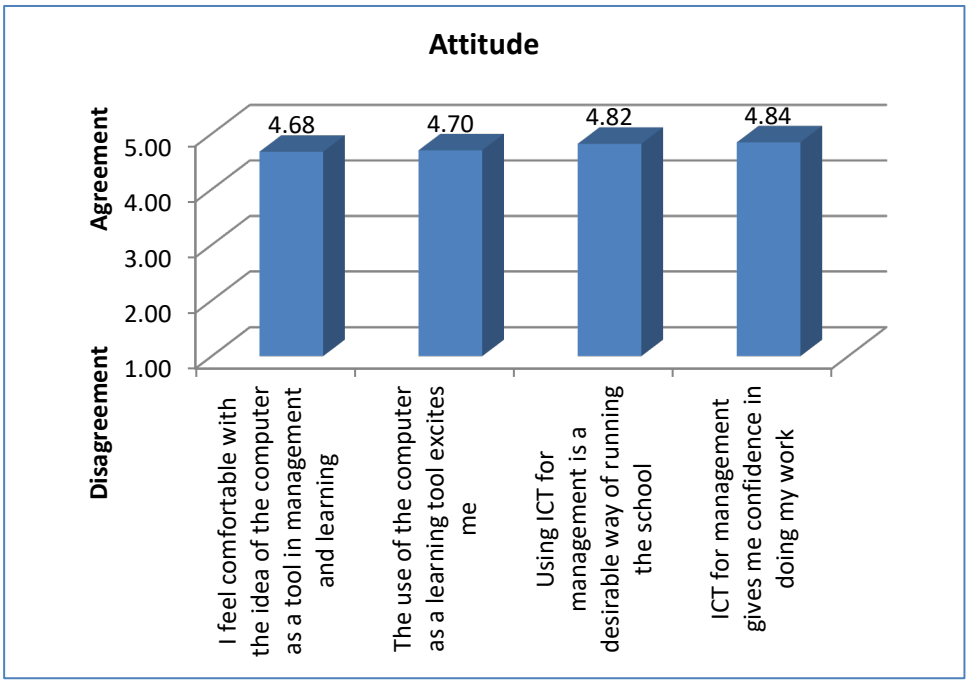
4.5.4 Attitude

This subsection dwelt on the questions regarding the attitude of the SMT members in adopting the innovation. The questions in the section were:

- I feel comfortable with the idea of the computer as a tool in management and learning
- The use of the computer as a learning tool excites me
- Using ICT for management is a desirable way of running the school
- ICT for management gives me confidence in doing my work

The model of this research work was intended to provide clarifications on the negative or positive attitudes concerning the use of ICT in the management of secondary schools. Participants were thus provided with five options as to why school management teams might have negative and positive attitudes concerning the use of ICT for management. The results are presented in Figure 4.16.

Figure 4.16: Attitudes towards the use of ICT for management



Out of a total of 4 questions intended to probe the attitudes of the senior management team towards ICT use, all had means above 3. This indicates very encouraging attitudes towards the use of ICT in the management of schools. The Student t- test value was more than test value, showing that there was significant evidence that the school management team has a positive attitude towards the use of ICT for management. According to Albugarni and Ahmed (2015), attitudes of leaders of schools regarding the use of ICT in management create one of the main reasons in its positive incorporation into an institution's processes. In examining the attitudes of the school managers, it is imperative to note that this has a strong effect on the use of ICT for management. Looking at the relative advantage responses, for example, how these leaders answered the questions on how they had seen technology as an aid to their day to day activities, the attitude of these leaders could have been influenced by the school principals in making use of the technology. Literature suggests that strong affirmative attitude towards change is likely to be dependent on the benefits that come with it (Buabeng-Andoh, 2012). The findings support the notion, as evidenced by the number of respondents who agreed that they had seen the benefits of using the technology. However, literature also asserts that while positive attitude could be regarded as a precondition in taking an edge, it could be regarded as an obstructing factor, if there are

negative acuities (Kale & Goh, 2014). In relation to the findings, contrary to affirmative and assertive attitude, some school leaders may have had tentative and permissive attitudes about using ICT for management. This could have been due to the inadequate skills or knowledge about the use of ICT for management or ignorance. Since the Department of Education provides informal ICT training, this could have had a negative impact on the attitude of the educators. Some educators may feel relaxed with regards to the use of the innovation. Such attitudes could be avoided by introducing professional ICT qualifications in the secondary schools.

Based on these findings, it can be concluded that school leaders in Mashishila circuit with affirmative, assertive and obligatory attitudes towards ICT for management practice in schools are likely to display high levels of competence in the use of computers. On the contrary, a lack of these attitudes towards change is likely to elicit behaviours such as non-compliance, resistance, reluctance or in extreme cases, incapacity. Attitude is therefore imperative for the successful implementation and adoption of ICT for management in schools.

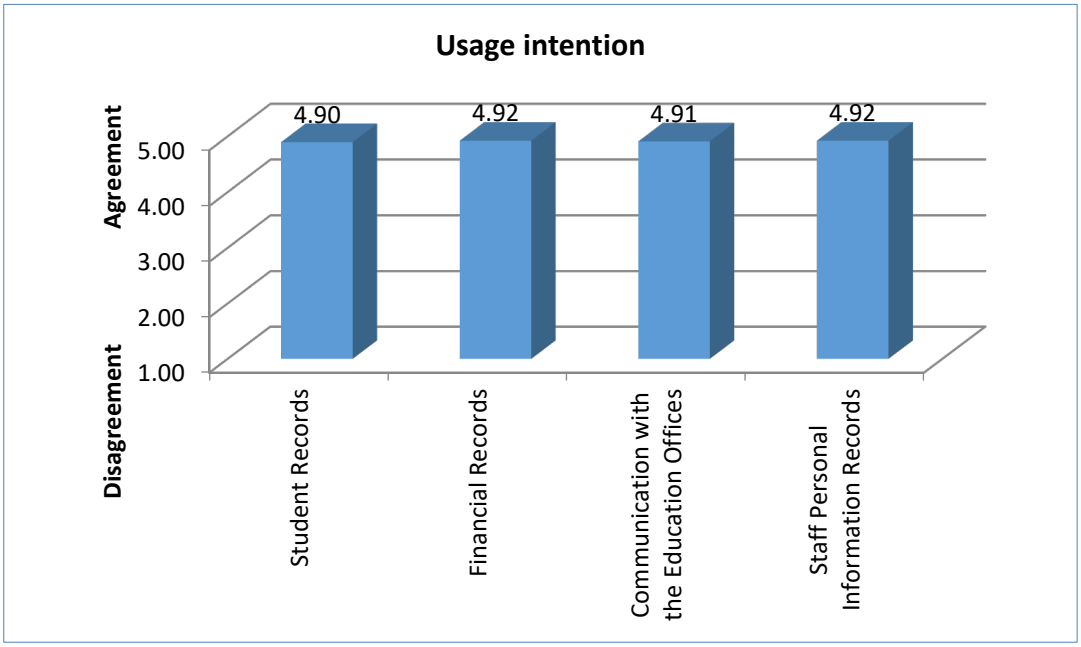
4.5.5 Usage intentions

Participants were enquired to specify the means in which ICT for management was important in their corresponding institutions. The lists of managerial intentions inferred about are listed below:

- Student records
- Financial records
- Communication with the education offices
- Staff personal information records

The results indicate that ICT for management is generally used for staff personal information records, keeping student records, communication with the Department of Education and keeping financial records. According to the t-test and the central measure of tendency, the mean, there is evidence to claim that all of the above activities, ICT for management was being used, yielding positive responses amongst the SMT members in all the schools. Figure 4.17 further illustrates this analysis.

Figure 4.17: Results for usage intention



The findings above indicate a positive response, in terms of ICT for management usage intentions. This is indicated by the mean values that are above 4. Student records may comprise records of learner progress, behaviour, as well as attendance. Record keeping helps schools keep track of the changes in their activities in the past and present. They also stand as the basis for determining what should be done in the future. This is worth it, as it permits stress-free access to information and safety. The findings of this research are in agreement with the view of Entwistle and Ramsden (2015), who indicated that keeping records on students' academic performance is vital for educational resolutions. This is also in agreement with the opinion of Burden (2016), who suggested that for effective school management, there should be academic record keeping. These findings are also in agreement with Burden (2016), who indicated that school records assist in determining the financial position of a school. The school expenditure is usually entered into proper ledger and in suitable bookkeeping records. Findings of this work also concur with Konyana and Konyana's (2013) opinion that data gathered from school records on learners' admission and school amenities can be used for planning resolutions.

In contrast to the positive finding explained above, for the usage intentions, the respondents who had given negative responses could be due to the fact that some of the

leaders of schools are not willing to learn the use of ICT in management. According to McDonagh and McGarr (2015), they describe these leaders as “Conservatism” leaders. These are the kind of leaders who feel that change and the use of ICT in the management of secondary schools is not essential and thus, they could choose traditional ways of doing things.

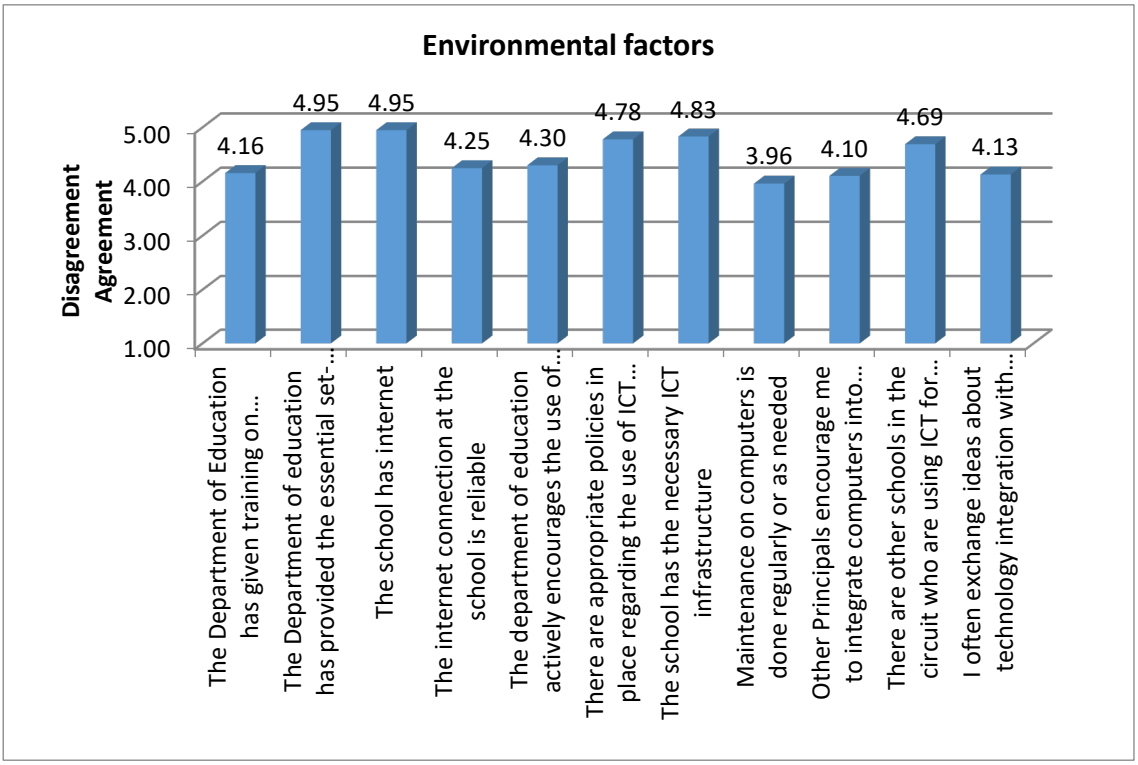
4.5.6 Environmental factors

In order to assess whether there were environmental factors aiding in the use of ICT for management, a number of questions were asked. The list of statements which were posed to the participants are presented below.

- The Department of Education has given training on implementing ICT management
- The Department of education has provided the essential set-up to implement ICT for management
- The school has internet
- The internet connection at the school is reliable
- The Department of Education actively encourages the use of ICT
- There are appropriate policies in place, regarding the use of ICT for management
- The school has the necessary ICT infrastructure
- Maintenance on computers is done regularly, or as needed
- Other Principals encourage me to integrate computers into management
- There are other schools in the circuit, which are using ICT for management
- I often exchange ideas about technology integration with other Principals

In response to these statements, a test of means using the central tendency measure was used. The results are presented in Figure 4.18.

Figure 4.18: Environmental Factors



Looking at the measure of central tendency, the mean, there is significance evidence that all the environmental factors were positively contributing to ICT use in secondary school management in the circuit. However, while the schools in the Mashishila Circuit had ICT policy papers, there is a significant difference between their ICT policy accesses to policy documents for ICT in order for operational incorporation in progressing secondary school management. This could be as a result of the absence of clarity on the integration of ICT strategies that are not rich enough, with regards to a well-designed incorporation idea. The other reason that could also hinder the maintenance of the computers is the lack of proper budget pertaining to upgrades of ICT equipment and knowhow on when upgrades should be done, on the part of the leaders of the schools. A small number of leaders indicated that the internet connections are not reliable. This could be due to the lack of clarity on how upgrades should be made, as well as who to contact when the schools experience failures in connectivity. Another reason could be the situation of these schools. Since these schools are situated in the rural set up, sometimes telephone lines experience difficulties in connection, making it

difficult to connect to the internet. Another reason could be due to the fact that some schools are upgrading their own infrastructure, apart from the upgrades coming from the Department of Education itself. Therefore, this results in posturing challenges in progressing ICT for the management of secondary schools in Mashishila circuit. Educators' professional development is a vital aspect to effective incorporation of ICT for management in secondary schools. Numerous literature discovered that regardless of being a novice or proficient user, training on ICT related programs increases educators' proficiencies in the use of computers (Roldán-Álvarez *et al.*, 2016). In this study finding, there is enough evidence to suggest that most leaders of the school had received ICT training from the Department of Education, given the mean score which is more than 4. This is a positive response, since regardless of whether one is a novice or a proficient user of computers, the technology keeps changing hence, the need to update knowledge in this knowledge era.

4.5.7 Summary

The majority of the participants responded positively towards the use of ICT in management. They agreed that using the technology helped them gain competence, as well as improving the way they go about their daily duties. They also agreed that the use of ICT decreased operational costs. However, this is a two-way response. The respondents might have agreed, basing their facts on the easiness that comes with the introduction of computers, since computers can process a huge amount of data in a short period of time, yet it is very expensive to acquire and maintain ICT infrastructure. Although the respondents were positive in the use of the technology, very few had negative attitudes. Such negative attitude could have come from the aging group of the respondents, which has been referred to as "conservatives" in this research. These are the stereotype leaders who feel there is no need to change from the way things were being done. Although the Department of Education provided training on the use of ICT, there were no professional ICT management programs being fostered. A number of respondents also indicated that the internet connections were not reliable. This could be due to the rural location of the schools. To circumvent such a problem, the Department should use the Telecommunications Act (103 of 1996) to assist in the availability of the internet.

.4.6 Contribution of ICT in the management of schools

In the third section, the respondents were asked questions regarding ICT for management, on how it has increased effectiveness in the management of secondary schools in Mashishila Circuit. The following managerial factors assisted in gathering the information.

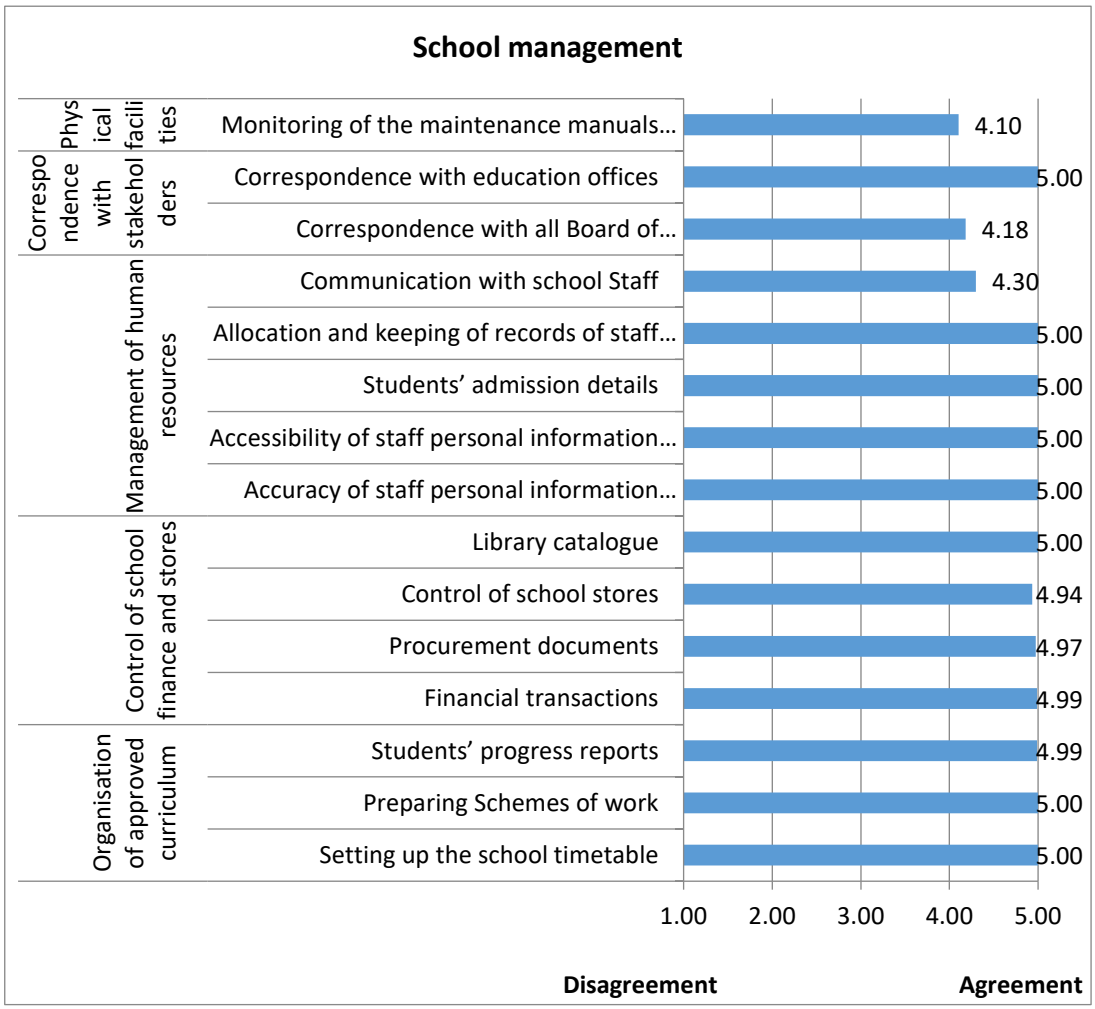
- Setting up the school timetable
- Preparing schemes of work
- Students' progress reports
- Financial transactions
- Procurement documents
- Control of school stores
- Library catalogue
- Accuracy of staff personal information records
- Accessibility of staff personal information records
- Students' admission details
- Allocation and keeping of records of staff responsibilities
- Communication with school staff
- Correspondence with all Board of Governors (BOG) and Parents Teachers Association (PTA)
- Correspondence with education offices
- Monitoring of the maintenance manuals for all physical facilities.

The findings of this section are presented in Addendum 8.

Using the tests of means, we can sufficiently claim that participants established that the roles of the senior management team had been made easier with ICT for management. The mean values of all the statements are above 3 and the test value is less than the computed statistic hence, there is significant evidence to claim that the SMT members agreed with the statements on the use of the innovation. It is further revealed that most of the participants approved that using ICT for management had upgraded performance in the management of learners' records. However, some participants felt that there is a

lot more needed to be done, as far as the use of ICT for communication with the staff members, as well as the parents' board. It has also been revealed that most of the participants agreed that from the findings below, it can be concluded that the use of ICT in management of schools enhanced the superiority of information and made the schools more effective while executing their chores. The graphical presentation of these statements is presented in Figure 4.19.

Figure 4.19: ICT in increasing effectiveness in management



Using ICT for management in monitoring physical resources does have numerous roles. This may include storing records of the physical resources, procurement practices of tracking down the necessary resources for the operation of the school (Sparrow *et al.,* 2016). The researcher wanted to find out the extent to which the use of ICT in management was being used to manage physical resources in the selected schools. The

findings indicated that most leaders were using ICTs to manage the physical resources, since the mean value was above 3. However, a small number did not agree. This could have been due to the fact that keeping records of the school physical records is mainly done by the principals, deputy principals, secretaries and heads of departments. The senior educators mainly concentrate on advising the leaders of the school and do not dwell much on record keeping. As such, these findings could have been from the senior educators.

The majority of the SMT members were in agreement that their schools used ICT for management in human resource administration. This finding is in agreement with Hopkins (2015), on ICT use in the administration of human resources. His research found out that most schools are being effective with the use of the technology to keep records and keeping track of student admissions. This research's findings support this, since all the participants indicated that indeed, the technology was being used in the human resource activities, except for communication with staff. Although communication with staff had a mean value more than 3, there are some who thought ICT for management is not doing enough. This may be as a result of some staff members not having computers hence, the leaders of the school could just use the easy way of sending message, maybe by sending a learner or verbally. Another reason may be that there is not enough publicity on the use of the technology within the schools, by leaders of the schools.

The use of ICTs for management in schools has been abstracted as to control different challenges encountered, particularly when it comes to monetary issues. Furthermore, Kurnia *et al.* (2015) point out that the use of ICTs in management helps with the possibility for growing school answerability, clearness and contribution among various interested parties. Moreover, it has also been noted that using ICTs for managing stakeholders can be empowered, be it in the civil society and the government, to accomplish improved results in anti-corruption and transparent determinations. As such, this research was to determine the extent to which school leaders were using ICTs to control school finance and stores in the selected secondary schools. Earlier work by Noor-Ul-Amin (2013) realised that ICTs were mostly being used in the management of financial records of students in schools. Conversely, this study went on to isolate the parts in which ICTs were being used in control of school finance and stores. In the

findings, the majority of the leaders of the schools indicated that ICTs were being used to control the library catalogue, controlling school stores, procurement of documents and financial statements. However, a small number did not agree, maybe due to the fact that they lacked ICT skills, or rather, they did not have the computers to do so.

4.6.1 Summary

Most of the participants agreed that using ICTs improved their effectiveness in management. It was also encouraging to note that most of the participants agreed that the technology was being used to track records of physical resources. However, there was a small fraction that disagreed and this could be attributed to those leaders of schools who were not practising ICT for management. This research has described them as “conservative” leaders. With regards to communication, some leaders indicated that the technology was not being used to convey message. This setback can have negative effect towards effectiveness in management, since communication is one of the priories of management. This could have been due to the fact that some educators did not have computer gadgets hence, the leaders of the schools conveyed messages verbally.

4.7 Conclusion

This chapter presented the findings of the research by discussing the use of ICTs in the management of schools. It began by presenting the biographical data, followed by the computer skills possessed by the leaders of schools. The drive of this chapter was to present results based on the use of ICT in the management of secondary schools, and to determine the contribution of ICTs in increasing the effectiveness of management in secondary schools, throughusing technology in the management of the schools. The following chapter summarises work that have been produced in all the chapters and the findings, as well as the recommendations from this research.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The previous chapter presented the findings and data analysis. The purpose of this chapter is to present the interpretations on the investigation of the problems specified in Chapter 1. Recommendations on the analysed data will be presented, in order to support the SMT and the Department of Basic Education in South Africa, as well as to aid in the difficulties that impede the adoption and practice of ICT in the management of secondary schools. The Diffusion of Innovation model helped address the explanations behind the adoption of ICT in the management of schools in Mashishila Circuit. Its key attributes, which stretch from the relative advantage, trialability, observability, compatibility, complexity and environmental factors, aided in unpacking the integration of the technology. The chapter begins by summarizing all the chapters in this research. This is then followed by a section that covers the extent to which the results of Chapter 4 have enabled to answer the research questions. Recommendations for further research are outlined in this chapter.

5.2 Summary of chapters

- **Chapter 1** offered the general overview of this research. The main aim of the research was to evaluate the use of ICT in the management of secondary schools in Mashishila Circuit. To address this problem, three research questions were conveyed, with the research objectives being to aid in responding to the research questions. The chapter then concludes by outlining the subsequent chapters in this work.

- **Chapter 2** is divided in two sections, the literature review and the theoretical framework. The literature indicated what is available on the use of ICT in the management of secondary schools and recognised the gaps that exist. The chapter began by analysing the work that exists in the management of secondary schools and its importance. The barriers and advantages of using the technology

are also explained. The literature section indicated that the adoption of ICT has certainly led to the paradigm shift in the management of secondary schools. The chapter also deliberated on a number of collective encounters for the effective adoption of the use of ICT in the management of schools and their suggested resolutions. The second part of this chapter is the theoretical framework. A comparison was made, followed by the selection of the model which is suitable for this study. The diffusion of innovation model was chosen as the best fit model for this work, since it consisted of social attributes that are related to a school setup. The chapter concluded by highlighting the advantages and disadvantages of ICT in the management of schools.

- **Chapter 3** clarified the process of the selection of the respondents, as well as the drawing, picking, scrutinising and data interpretation. This work chose purposive sampling method to sample the eleven secondary schools in Mashishila Circuit. This was due to the fact that it was cheap and easy for the investigator. The collection of data was done using the questionnaire (see Addendum 13). Data capturing was done using Excel, which was then transferred to the Statistical Package for the Social Sciences (SPSS). The chapter then concludes by the valuation of the collected data in form of graphs and interpretations. The reasons behind the selection of participants, the sample size, sampling method, as well as the analysis of the data, were described. The rationality dependability and limitations of the research were also deliberated on, as well the ethical considerations.

- **Chapter 4** aimed at the experiential research well-versed by the research methodology and analysis of data which was described in Chapter 3. It began by considering ICT use in the management of secondary schools, the usefulness of the technology in management of these schools, as well as the skills that the leaders of these schools possess, in order to carry out their duties.

- **Chapter 5** focuses on the findings and a comprehensive examination of the collected data during the practical investigation procedure, as described in Chapter 4. The investigation was constructed from the gathered data through the use of questionnaires, as conversed in Chapter 4. The rest of this chapter unfilled

a more comprehensive exploration of the data analysed, the deductions made from these explorations, as well as some denigrations rising out of these inferences. This chapter then provides recommendations for further studies.

5.3 Answering the research questions

In chapter 1, this study proposed three research questions. As a reference point, the research questions centred around the following issues:

- The level of skills competence in senior managers of secondary schools, for using technology in the management of the schools
- The use of ICT in secondary school management
- The contribution of ICT in improving the effectiveness of the management in secondary schools

5.3.1 The level of skills competence in SMT members in using technology in management

To determine the skills competence of the school management team, the Diffusion of innovation model helped to look at the specific questions that probed these senior educators in general computer use, the use of computers in the management of the school, experience in the use of the computers, professional qualifications in ICT, experience in Microsoft packages, as well as knowledge of internet use. The findings on the skills of the use of ICT indicate that most of the respondents were average in ICT skills, as well as in using Microsoft packages. All of the respondents also indicated that they had no ICT professional qualifications. This could have a negative impact on the adoption rate. This shows that the senior management team were gaining skills though self-discovery methods. The most frequently used applications by the administrators and management were Office tools such as Microsoft office (Excel, Word and PowerPoint). The results also revealed that some leaders of the schools were more skilled in using the computer and this could have been attributed to the training they might have received from the Department of Education. However, none the respondents had ICT professional qualifications. Leaders of schools should continuously upgrade their skills with regards to the use of the technology, in order to be at par with the

technological developments. Lo *et al.* (2015) discovered that practice in computer use improves computer skills, which eventually leads to competent leadership. Their findings also concur with this research findings, since most of these leaders of schools who had skills in computer use were practising ICT for management. A small number of the participants did not have computer skills. For this objective, it is clear that there was lack of government support regarding the professional training of the senior management teams, regardless of the laws that have been passed, as highlighted in Chapter 2. The Diffusion of Innovation Model helped to unpack the environmental factors that could impede the adoption of the innovation. Such factors include the laws pertaining to the adoption of an innovation by secondary schools in the country. This is supported by the responses in which the participants indicated that they were not confident in using the computers, as well as lacking the professional qualifications with regards to knowledge and skills of ICT for management.

The major finding of this research was that there were no explicit ICT essentials which were constantly regarded as undesirable by the schools in Mashishila Circuit. The bulk of the components were evaluated as positive by the participants. Considering the speed at which technology is advancing, the rate at which the senior management team computer skills are being acquired tends to be below expectation. It seems there is little acknowledgement of the laws pertaining to the improvement of secondary schools, in order to foster the effective use of technology which assists educators in their training to acquire professional ICT qualifications.

5.3.2 The use of ICT in secondary school management

In order to get clarity on the use of ICT in the secondary schools in Mashishila Circuit, the DOI model's attributes of relative advantage, observability, trialability, compatibility, complexity, attitude, user intentions and environmental factors aided in structuring the questionnaire. However, of these attributes, compatibility and complexity got strongly agree responses from all the participants, making it difficult for analysis. This objective sought to investigate ICT use in the management of secondary schools.

Regarding the findings on the relative advantage of the use of ICT in terms of reducing the cost, most of the participants agreed that there was relative advantage towards decrease in cost, due to the use of the technology. Although all of the participants agreed, this could be due to the fact that they were basing on the ease that computers bring when having work done. Advancing in the use of ICT can be cost-effective, but the total cost of owning ICT infrastructure comprising hardware, software, maintenance, development and upgrading remains high (Mshanga, 2014). Ebere (2016) discovered that expenses for acquiring and repairing ICT infrastructure are expensive. As such, the participants who responded positively might not have compared the cost of buying and maintaining the infrastructure, as opposed to the ease of work it produces.

Findings under observability showed that indeed, the educators were using the technology after having seen the good it brings. The researcher sought to find out the encouragement of the use of ICT for management by observing through communication, demonstration or describing ICT adoption by other leaders from other schools as having a positive impact on the respondents' work. These findings concur with the observability theory, which describes it as the degree to which the effects of an invention are noticeable, as witnessed by fellows of a collective structure, is certainly correlated to the adoption rate (Shippee, 2016). The other participants who gave adverse answers could have been due to the lack of conceptualisation, since some innovations are difficult to observe (Pandolfini, 2016).

Findings on user intention are in agreement with the view by Entwistle and Ramsden (2015), who specified that keeping student records is vital for educational determinations. This is also in covenant with the view of Burden (2016), who advocated that for operative school management, there should be record keeping in learning institutions. Results indicated that more than half of the participants used ICTs in the management of secondary schools. However, participants also had mixed views over the trialability of ICT usage, since the Department of Education did not give them a trial period for using ICT for management. This could have had a negative attitude towards the adoption of the innovation.

According to Albugarni and Ahmed (2015), attitudes of leaders of schools with regards to the use of ICT in management create one of the main reasons in its positive

incorporation into an institution's processes. In examining the attitudes of the school managers, it is imperative to note that this has strong effects on the use of ICTs for management. Looking at the relative advantage responses, for example, how these leaders answered the questions on how they had seen technology as an aid to their day to day activities, the attitude of these leaders could have been influenced by the school principals in making use of the technology. Literature suggests that strong affirmative attitude towards change are likely to be dependent on the benefits that come with it (Buabeng-Andoh, 2012). The findings support the notion, as evidenced by the number of respondents who agreed that they had seen the benefits of using the technology. However, literature also asserts that while positive attitude could be regarded as a precondition in taking an edge, it could be regarded as an obstructing factor, if there are negative acuities (Kale & Goh, 2014). In relation to the findings, contrary to affirmative and assertive attitude, some school leaders may have had tentative and permissive attitudes about using ICT for management. This could have been due to the inadequate skills or knowledge about the use of ICTs for management or ignorance. Based on these findings, an assumption can be arrived at, that leaders of schools in Mashishila Circuit with affirmative, assertive and compulsory attitudes towards ICT for management practice in schools are likely to display high levels of charge on the use of the innovation. On the contrary, tentative, apprehensive and non-compulsory attitudes towards change are likely to elicit behaviour such as non-compliance, resistance, reluctance or in extreme cases, incapacity. Attitude is therefore imperative for the successful implementation and adoption of ICT for management in schools.

On environmental factors, most participants agreed that they indeed were getting support from the Department of Education, on the use of technology. Numerous literature discovered that regardless of being a novice or proficient user, training on ICT related programs increases educators' proficiencies in the use of computers (Roldán-Álvarez *et al*., 2016). Based on the finding of this study, there is sufficient indication to suggest that most leaders of the schools had received ICT training from the Department of Education. This is a positive response, since, irrespective of whether one is a beginner or an expert in computer use, it is important to update knowledge in this knowledge era. While the schools in the Mashishila Circuit had ICT policy papers, there was a significant difference between their ICT policy accesses to policy documents for ICT in order for operational incorporation in progressing secondary school

management. Such hindrances could be a result of the lack of clarity on the integration of ICT. It was also discovered that maintenance is only done when a problem arises. This could be attributed to the lack of proper budget pertaining to upgrades of ICT equipment and knowhow on when upgrades should be done on the part of the leaders of the schools.

According to Rogers (2010), an innovation has to be tested and its benefits noticed, in order for it to increase the chances of it being easily adopted. Most schools also indicated that they had policy documents, but it remains unclear whether in the policy documents, the use of ICT for management is clearly articulated. It is also encouraging to note that a considerable number of participants had positive attitudes towards the use of ICT in management. However, there are those participants who had negative attitudes towards the use of the technology. Such participants may be regarded as the "conservatism" who need intervention strategies to assist them to change their attitudes. On environmental factors, although most of the leaders of the schools gave positive responses, reliability of internet connections was a concern among some schools. This could be because of the geographic location of the Mashishila Circuit. Since it is in a rural setup, sometimes connectivity is a problem due to telephone lines disconnections.

5.3.3 Contribution of ICT towards the effectiveness of the management in secondary schools

Effectiveness is the point at which a schools' anticipated goals are properly realised, bearing in mind the strains from the external and internal settings. According to Matthews and Rix (2013), school effectiveness in management refers to " the goal set by administrative leaders through their leadership strategies to help schools reach certain achievements across the board" (Matthews & Rix, 2013, p.36). The findings of this research indicate that most schools were using ICT in financial management. Good financial management is an essential ingredient for ICT applications' effectiveness. Therefore, there is need for supporting financial operations of ICT applications by the senior management team. Conversely, a small number of SMT members did not agree that ICT for management was being used to communicate with the teachers. As such, this could have been due to the lack of computers on the part of the staff, to convey the message.

Apart from financial management, data management which includes student and educator records, is also an effective part of school leadership management. It is important that schools maintain accurate and updated information on its all levels and aspects. In this regard, a lot of participants agreed to the use of ICT in the keeping of records. ICT applications help in keeping levels and aspects of the school, including students, teachers, staff, details of meeting minutes, school publicity, curriculum development material, as well as the entire management information. The findings also showed that there is an average response that ICTs were being used to communicate with the Department of Education offices. ICT application transaction between the Department of Education and the school will be more efficient and direct if this can be practised frequently, thus lessening the physical gathering and inspection of essential data and reducing the replication of data. Such average responses could again be attributed to the unreliability of the internet connections, as well as the lack of trained personnel in retrieval of emails and the use of the technology. It is also interesting to note that as educators become experts in the use of the technology, communication amongst them could be done through cell phones, with messages being sent from the central computer to convey a message or information. As such, this research was to determine the extent to which school leaders were using ICTs to control school finance and stores in the selected secondary schools. Earlier work by Noor-Ul-Amin (2013) realised that ICTs were mostly being used in the management of financial records of students in schools. Conversely, this study went on to isolate the parts in which ICTs were being used to control school finance and stores. In the findings, the majority of the leaders of the schools indicated that ICT was being used to control the library catalogue, controlling school stores, procurement of documents and financial statements. However, a small number did not agree, maybe due to the fact that they lacked ICT skills or rather, they did not have computers to do so.

5.4 Summary of the findings

This research was intended for the school management teams which consisted of the principals, their deputies, the heads of departments, senior educators and the school clerks. The DOI was meant to identify and alert a number of key issues involved in integrating ICTs in the management of secondary schools in Mashishila Circuit. The

framework provided the platform to gather information related to the use of ICTs, the skills possessed by the SMT with regards to the adoption of ICTs in the management of secondary schools. Basing on the fact that there is an increase in the amount of information in recent years, there is need to store, record, share and processes it, with various stakeholders which are fundamental to the running of schools. The computers enable the running of schools to be more efficient and timeously.

This study established that there were schools which were obedient to the ICT policy documents. There is a significant difference between schools' loyalty to ICT policy documents and operative incorporation of ICT for management in secondary schools. This could have been a result of the lack in the policy formulation technique and the incorporation progression from the early phases. This study established that there was not enough contribution by the Department of Education in the ICT training for the effective incorporation of ICT for management of secondary schools in the circuit. This may be supported by the absence of professional qualifications in ICT skills, by all of the respondents.

The findings of this study also revealed that ICT policies and guidelines may not be quite clear in managing the ICT incorporation method, with regards to involving the employees of the department and equipping the administrative areas in schools in ICT. Thus, training the school senior management team on the use of ICT might not be clearly indicated in the policies. It may also be that the school policies have also not sufficiently indicated the part of numerous education players, varying from the learners, educators and the school management teams. This may pose a challenge, since the school management teams might not completely appreciate their part and obligation in incorporating ICT for management in secondary schools. This could clarify the reason why ICT integration in the secondary schools of the Mashishila Circuit is fairly unnerving assignment, although all of the schools have reasonably noble ICT infrastructure.

5.5 Recommendations

In order for ICTs to yield benefits in secondary schools' management, this work recommends approaches that could be made to progress ICT use in secondary school

management. As indicated in Chapter 2, facilitating the purchase of ICT infrastructure for secondary schools in South Africa is hindered by the non-existence of monetary possessions. As pointed out in the first chapter, this work was inspired by the investigator's reflection on many SMTs in secondary schools, where the researcher is employed. They are provided with modern ICT equipment, with the determination of refining their performance in management, yet they often fail to effectively make use of these ICT resources.

The researcher therefore recommends the following to be executed, in an effort to upsurge the usage of ICT in the management of secondary schools in South Africa.

1. The leaders of schools need to improve their ICT skills, in order to be effective in their new managerial roles as innovation users.

2. The department needs to foster the schools' use of ICT, through highlighting to them the different laws that have been passed in relation to the adoption of the technology. Such laws include the Skills Development Amendment Act, No. 31 of 2003.

3. The ICT Department of Education should also conduct ICT training sessions and workshops and come up with several media concentrating on specialised advancement of leaders of schools.

4. In addition, this study suggests that administrators need a comparative understanding of ICT integration, and must be willing to use the knowledge and resources to promote technology in their management tasks.

5. Findings in Chapter 4 indicate that schools have policy documents thus, COBIT and ITIL could be introduced in schools. This would aid in monitoring the goals and objectives of the institution, if they are being met and the individuals concerned be rewarded accordingly.

6. Having discovered that they may be “conservatism leaders”, balance score cards should also be introduced in schools, in order to assess if the intuitions’ goals and objectives are being successfully met.

In order to achieve these recommendations, schools are advised to come up with strategies to yield the benefits of adopting the technology. The researcher discovered that the lack of fruitful results in using the technology may be due to the lack of proper guidelines in the adoption process. The following subsections are recommendations for schools to use, in order to achieve the success of using the innovation.

5.5.1 Strategically aligning ICT for management

As stated earlier in the research framework, for the Department of Education’s policy to become a certainty, schools should have computer centres and internet connections which are reliable. For this to be achieved, proper planning and management need to be put in place. This would assist in finding the solutions to the following questions:

1. How will the innovation be used to aid in efficient and effective administration of the school?
2. How will the innovation be maintained?
3. What technical backing is essential to preserve them?
4. What kind of plans are there for improvement and upgrading the innovation?
5. What are the professional development plans for the staff in the use of the technology in management?

5.5.2 Vision for ICT development in schools

In order to avoid resistance from the “conservatism” leaders described in this research, the schools should come up with a common vision in the implementation of ICTs for the management of schools, which involves probing and responding to a number of questions (Stromquist & Monkman, 2014).The vision of the schools should be guided by examples in the following questions:

a. **Where** will the innovation take you in the near future?

b. **How** will the innovation take you where you want to be?

c. **Why** are you intending to adopt the innovation?

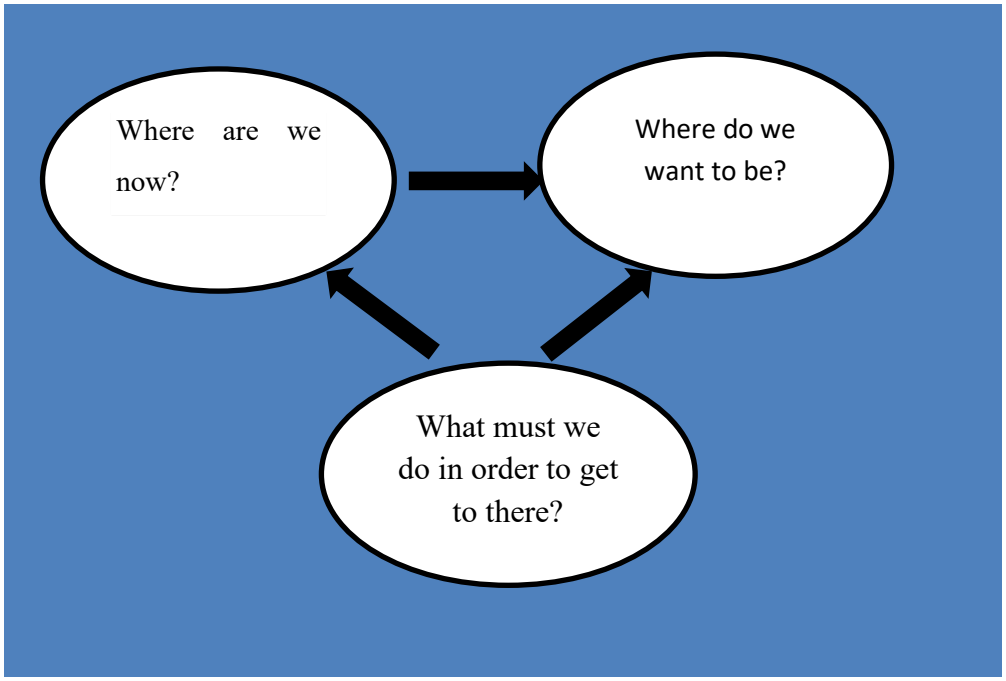
d. **What** goals do you wish to accomplish?

e. **What** values are there in place to accomplish this vision?

According to Uluyol and Şahin (2016), a vision is a picture of your favourite situation in the future regarding the innovation. It is a functional approach, replicating selections of what to do and what not to do (Jorgenson & Vu, 2016). As such, the schools in Mashishila Circuit will have an insight on what exactly they want to achieve in the near future, in terms of ICT for management. A diagrammatic display of the vision plan is presented in Figure 5.1.

5.5.3 Planning questions on ICT for management vision

Figure 5.1: Planning for the school ICT vision



5.5.4 Conducting a SWOT analysis

According to Unhelkar (2016), a SWOT analysis is used to gather information on the state of a phenomenon. A SWOT stands for:

S = Strengths

W= Weaknesses

O = Opportunities

T = Threats

This analysis assists in answering the questions above in terms of the innovation. After presenting a vision, schools should come up with a SWOT analysis. This helps them assess where they stand in terms of ICT for management and the way forward, in order to yield the best results from using the technology. Examples of strength, weaknesses, opportunities, and threats for the secondary school structure are presented next.

5.5.4.1 Examples of strength

- The SMT is dedicated to incorporating ICTs in the management of schools
- The leaders of the schools already do managerial responsibilities using ICT
- The school management teams are efficient and well organised in gearing the method of incorporating ICT in the management of the schools
- The infrastructure of the schools permits safety, reduces risks for the innovation to be stolen

5.5.4.2 Examples of weaknesses

1. The leaders of the schools have little skills and knowledge in using the computer for management.
2. The schools do not have clear planning for using ICT for management.

5.5.4.3 Examples of opportunities

- The Department of Education is eager to upsurge the financial plan for the development of staff to improve ICT skills.
- Organisations have provided modern ICT equipment to the school

5.5.4.4 Examples of threats

According to Ollo-López and Aramendía-Muneta (2012), the environment in which the schools are situated has got high levels of crime, due to high numbers of unemployed people. As such, this makes the schools more susceptible to the likelihood that the ICT equipment might be stolen or be prone to disasters.

Having listed all these, the schools should be able to review their stances after a given period of time. This assists in identifying the loopholes in terms of the use of the innovation and be able to dwell on them, for the best use of ICT in management of these secondary schools.

5.6 Recommendation for further studies

Given any research, there are limiting constraints, regardless of being integral to the research design or casual. Such confines are imperative for they offer the basis for future study. Since this research was administered within one circuit of Gert Sibande District in Mpumalanga Province, related works should also be carried out in the other circuits of the district in this province. This would help us ascertain whether the same findings do exist in the other circuits. Lastly, further studies could also be centred on the evaluation of the ICT training gathered by educators to define its effectiveness.

5.7 Conclusion

The findings of this study were clearly presented in this chapter. This chapter particularly addressed the conclusion of the work, recommendations and recommendations for future use. The chapter also highlighted major transformations that have to be made in schools, in order to appreciate the adoption of the innovation. The findings of the research objectives were also discussed, with emphasis on those areas where improvements should be made with regards to the adoption of the innovation in the management of secondary schools.

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ADDENDUM 1: Concept Matrix

Reference	School Administration	ICT adoption	Change Management	Advantages of Schools Management adoption of ICT	Barriers at School level	Total
Abdillah (2014)	**1**		**1**			**2**
Adeyemi & Olaleye (2010)	**1**					**1**
Adomi and Kpangban, (2010)	**1**					**1**
Alkhawaldeh and Menchaca (2014)	**1**			**1**	**1**	**3**
Biagi and Loi, (2013)			**1**	**1**		**2**
Boadu (2014)		**1**	**1**	**1**		**3**
Buabeng-Andoh (2012)	**1**	**1**				**2**
Burden (2016)	**1**			**1**		**2**
Celik and Yesilyurt (2013)		**1**				**1**
Conger (2015)				**1**	**1**	**2**
Earley and Greany (2017)	**1**	**1**				**2**
Ebere (2016)	**1**		**1**			**2**
Entwistle and Ramsden (2015)	**1**				**1**	**2**
Ezekoye (2017)	**1**					**1**

Fox (2016)		**1**				**1**
García-Muñiz and Vicente (2014)		**1**		**1**		**2**
Gedwar (2016)					**1**	**1**
Ghavifekr et al. (2013)	**1**		**1**			**2**
Grant and Osanloo (2014)	**1**			**1**		**2**
Hadjithoma-Garstka (2011)				**1**	**1**	**2**
Hammond (2014)	**1**					**1**
Hansen (2011)		**1**	**1**			**2**
Hashim (2015)	**1**	**1**				**2**
Heystek (2011)			**1**	**1**		**2**
Hopkins (2015)	**1**					**1**
Hudson (2013)	**1**	**1**	**1**			**3**
Jabin (2016)	**1**					**1**
Jones et al. (2011)				**1**	**1**	**2**
Kale & Goh (2014)			**1**			**1**
Kayisire & Wei (2016)			**1**	**1**	**1**	**3**
Kerubo (2016)				**1**		**1**
Konyana & Konyana (2013)		**1**	**1**	**1**		**3**
Kopcha (2010)	**1**		**1**	**1**		**3**

Li & Garnsey (2012)	**1**	**1**				**2**
Liu and Pange (2015)	**1**			**1**		**2**
Lowyck (2014)		**1**	**1**			**2**
Makewa et al. (2011)	**1**	**1**			**1**	**3**
Makhanu & Kamper (2012)			**1**	**1**	**1**	**3**
Manyau (2015)		**1**	**1**			**2**
Mathevula & Uwizeyimana (2014)	**1**					**1**
McDonagh & McGarr (2015)	**1**	**1**				**2**
McLaren (2015)	**1**				**1**	**2**
Mihai & Nieuwenhuis (2015)				**1**		**1**
Mojapelo (2014)	**1**				**1**	**2**
Mokgadi (2015)	**1**			**1**	**1**	**3**
Mshanga (2014)	**1**		**1**	**1**		**3**
Mtebe and Raisamo (2014)				**1**		**1**
Muchai and Kimuyu (2016)	**1**		**1**			**1**
Muriko (2015)		**1**		**1**	**1**	**3**
Mwalongo (2011)				**1**		**1**
Ngugi (2012)		**1**				**1**
Nguyen and Burgess (2014)	**1**		**1**			**2**

Nilsen (2015)	**1**	**1**	**1**			**3**
Noor-Ul-Amin (2013)		**1**				**1**
Oboegbulem & Ugwu (2013)			**1**	**1**	**1**	**3**
Oliveira & Martins (2010)					**1**	**1**
Oyier et al. (2015)				**1**	**1**	**2**
Pandolfini (2016)	**1**					**1**
Prokopiadou (2012)		**1**	**1**			**2**
Richardson (2011)				**1**		**1**
Roberts and Sikes (2011)					**1**	**1**
Sallis (2014)		**1**	**1**	**1**		**3**
Shah (2014)	**1**				**1**	**2**
Shin, (2015)	**1**		**1**			**2**
Shippee (2016)			**1**			**1**
Soja & Cunha (2015)		**1**		**1**		**2**
Waema & Adera (2011)	**1**	**1**	**1**			**3**
Wiseman & Anderson (2012)		**1**	**1**			**2**

ADDENDUM 2: Relative Advantage

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
1.1 ICT for management increases my competence as a leader	77	4.96	.253	.029
1.2 Using ICT for management improves the presentation of my work	77	4.99	.114	.013
1.3 Using ICT for management decreases operational costs	77	4.99	.114	.013
1.4 By using ICT for management I have gained competency in my daily activities	77	4.99	.114	.013
1.5 Using ICT for management has made me more effective in carrying out my daily duties	77	4.99	.114	.013
1.6 Using ICT for management improves the quality of my work, in general	77	4.99	.114	.013

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
1.1 ICT for management increases my competence as a leader	67.888	76	.000	1.961	1.90	2.02
1.2 Using ICT for management improves the presentation of my work	153.000	76	.000	1.987	1.96	2.01
1.3 Using ICT for management decreases operational costs	153.000	76	.000	1.987	1.96	2.01
1.4 By using ICT for management I have gained competency in my daily activities	153.000	76	.000	1.987	1.96	2.01
1.5 Using ICT for management has made me more effective in carrying out my daily duties	153.000	76	.000	1.987	1.96	2.01
1.6 Using ICT for management improves the quality of my work, in general	153.000	76	.000	1.987	1.96	2.01

ADDENDUM 3: Trialability

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
4.3 I have tried ICT for management and seen how important it is in decision making	77	3.45	1.165	.133
4.4 Before deciding on whether or not to adopt ICT for management, I am/was able to use it on a trial basis.	77	3.13	1.321	.151
4.5 . Before deciding on whether or not to adopt ICT for management, I am/was able to test the suitability of its services	77	3.19	1.267	.144
4.6 I have tried to use ICT for management on a trial basis long enough to see what it can do.	77	3.19	1.288	.147

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
4.3 I have tried ICT for management and seen how important it is in decision making	3.425	76	.001	.455	.19	.72
4.4 Before deciding on whether or not to adopt ICT for management, I am/was able to use it on a trial basis.	.862	76	.391	.130	-.17	.43
4.5 . Before deciding on whether or not to adopt ICT for management, I am/was able to test the suitability of its services	1.349	76	.181	.195	-.09	.48
4.6 I have tried to use ICT for management on a trial basis long enough to see what it can do.	1.327	76	.188	.195	-.10	.49

ADDENDUM 4: Observability

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
5.1 Staff who use ICT work more efficiently	77	3.48	1.294	.147
5.2 Staff who use ICT produce well-presented work	77	3.97	1.135	.129
5.3 Staff who use ICT show enthusiasm regarding their work	77	4.23	1.050	.120
5.4 Staff members using ICT for management enjoy using it	77	4.36	.986	.112
5.5 Staff members seem interested in using ICT for management when they see others using it	77	4.48	.898	.102

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
5.1 Staff who use ICT work more efficiently	3.259	76	.002	.481	.19	.77
5.2 Staff who use ICT produce well-presented work	7.529	76	.000	.974	.72	1.23
5.3 Staff who use ICT show enthusiasm regarding their work	10.311	76	.000	1.234	1.00	1.47
5.4 Staff members using ICT for management enjoy using it	12.141	76	.000	1.364	1.14	1.59
5.5 Staff members seem interested in using ICT for management when they see others using it	14.475	76	.000	1.481	1.28	1.68

ADDENDUM 5: Attitude

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
6.1 I feel comfortable with the idea of the computer as a tool in management and learning	77	4.68	.715	.082
6.2 The use of the computer as a learning tool excites me	77	4.70	.689	.079
6.3 Using ICT for management is a desirable way of running the school	77	4.82	.479	.055
6.5 ICT for management gives me confidence in doing my work	77	4.84	.488	.056

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
6.1 I feel comfortable with the idea of the computer as a tool in management and learning	20.553	76	.000	1.675	1.51	1.84
6.2 The use of the computer as a learning tool excites me	21.652	76	.000	1.701	1.54	1.86
6.3 Using ICT for management is a desirable way of running the school	33.292	76	.000	1.818	1.71	1.93
6.5 ICT for management gives me confidence in doing my work	33.132	76	.000	1.844	1.73	1.96

ADDENDUM 6: Usage Intention

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
7.1Student Records	77	4.90	.383	.044
7.2 Financial Records	77	4.92	.315	.036
7.3 Communication with the Education Offices	77	4.91	.332	.038
7.4 Staff Personal Information Records	77	4.92	.315	.036

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
7.1Student Records	43.402	76	.000	1.896	1.81	1.98
7.2 Financial Records	53.574	76	.000	1.922	1.85	1.99
7.3 Communication with the Education Offices	50.499	76	.000	1.909	1.83	1.98
7.4 Staff Personal Information Records	53.574	76	.000	1.922	1.85	1.99

ADDENDUM 7: Environmental Factors

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
8.1 The Department of Education has given training on implementing ICT management	77	4.16	1.309	.149
8.2 The Department of education has provided the essential set-up to implement ICT for management	77	4.95	.223	.025
8.3 The school has internet	77	4.95	.223	.025
8.4 The internet connection at the school is reliable	77	4.25	1.279	.146
8.5 The department of education actively encourages the use of ICT	77	4.30	1.182	.135
8.6 There are appropriate policies in place regarding the use of ICT for management;	77	4.78	.661	.075
8.7 The school has the necessary ICT infrastructure	77	4.83	.637	.073
8.8 Maintenance on computers is done regularly or as needed	77	3.96	1.601	.182
8.9 Other Principals encourage me to integrate computers into Management	77	4.10	1.392	.159
8.10 There are other schools in the circuit who are using ICT for management	77	4.69	.862	.098
8.11 I often exchange ideas about technology integration with other principals	77	4.13	1.351	.154

ADDENDUM 8: Contribution of ICT in improving Management of Schools

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
9.3 Students' progress reports	153.000	76	.000	1.987	1.96	2.01
9.4 Financial transactions	153.000	76	.000	1.987	1.96	2.01
9.5 Procurement documents	76.000	76	.000	1.974	1.92	2.03
9.6 Control of school stores	57.294	76	.000	1.935	1.87	2.00
9.12 Communication with school Staff	8.002	76	.000	1.299	.98	1.62
9.13 Correspondence with all Board of Governors (BOG) and Parents Teachers Association (PTA)	8.008	76	.000	1.182	.89	1.48
9.15 Monitoring of the maintenance manuals for all physical facilities	7.263	76	.000	1.104	.80	1.41

e-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
9.1 Setting up the school timetable	77	5.00	.000[a]	.000
9.2 Preparing Schemes of work	77	5.00	.000[a]	.000
9.3 Students' progress reports	77	4.99	.114	.013
9.4 Financial transactions	77	4.99	.114	.013
9.5 Procurement documents	77	4.97	.228	.026
9.6 Control of school stores	77	4.94	.296	.034
9.7 Library catalogue	77	5.00	.000[a]	.000
9.8 Accuracy of staff personal information records	77	5.00	.000[a]	.000
9.9 Accessibility of staff personal information records	77	5.00	.000[a]	.000
9.10 Students' admission details	77	5.00	.000[a]	.000
9.11 Allocation and keeping of records of staff responsibilities	77	5.00	.000[a]	.000
9.12 Communication with school Staff	77	4.30	1.424	.162
9.13 Correspondence with all Board of Governors (BOG) and Parents Teachers Association (PTA)	77	4.18	1.295	.148
9.14 Correspondence with education offices	77	5.00	.000[a]	.000
9.15 Monitoring of the maintenance manuals for all physical facilities	77	4.10	1.334	.152

a. t cannot be computed because the standard deviation is 0.

ADDENDUM 9: General Computer Usage

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
10.1 General computer usage	77	4.19	1.101	.125
10.2 Using the computer for management of the school	77	4.12	1.224	.140

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
10.1 General computer usage	9.525	76	.000	1.195	.94	1.44
10.2 Using the computer for management of the school	8.004	76	.000	1.117	.84	1.39

ADDENDUM 10: Skills of SMT members

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
12.1 Microsoft Word	77	2.86	1.345	.153
12.2 Microsoft Excel	77	2.91	1.300	.148
12.3 Document Management	77	2.94	1.291	.147
12.4 Email	77	2.92	1.306	.149
12.5 Power point presentations	77	3.01	1.272	.145
12.6 Internet usage	77	3.00	1.277	.146

One-Sample Test

	Test Value = 2					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
12.1 Microsoft Word	5.593	76	.000	.857	.55	1.16
12.2 Microsoft Excel	6.138	76	.000	.909	.61	1.20
12.3 Document Management	6.355	76	.000	.935	.64	1.23
12.4 Email	6.198	76	.000	.922	.63	1.22
12.5 Power point presentations	6.988	76	.000	1.013	.72	1.30
12.6 Internet usage	6.870	76	.000	1.000	.71	1.29

ADDENDUM 11: Chi Square Test for the Skills of SMT members

Test Statistics

	13.1 Microsoft Word	13.2 Microsoft Excel	13.3 Document Management	13.4 Email	13.5 Power point presentations	13.6 Internet usage
Chi-Square	130.727[a]	81.766[a]	106.312[a]	92.156[a]	102.026[a]	107.610[a]
df	4	4	4	4	4	4
Asymp. Sig.	.000	.000	.000	.000	.000	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 15.4.

ADDENDUM 12: Questionnaire for ICT usage in management of schools

Section A: Biographical Information

Please mark only ONE option per question.

1. What is your gender?

	Female
	Male

2. What is your age group?

	20 years or younger
	21 – 29 years
	30 – 39 years
	40 – 49 years
	50 – 59 years
	60 years or older

3. To which ethnic group do you belong?

Black	Coloured	Indian	White	Other: Specify

4. What is the country of your citizenship?

South Africa	Zimbabwe	Botswana	Mozambique	Namibia	Other, Specify

5. What position do you occupy within the school? (Select **ONE** option only)

	Principal
	Deputy Principal
	HOD
	Senior Educator
	Office Clerk

6. What is your highest level of education?

	No formal education
	Some/ all Primary School
	Some/ all Secondary School
	Tertiary Certificate or Diploma
	Bachelors degree
	Honours degree
	Masters degree
	Doctorate

7. How long have you been employed at this school?

	Fewer than 5 years
	From 5 to less than 10 years
	From 10 to less than 15 years
	From 15 to less than 20 years
	From 20 to less than 25 years
	25 years or more

SECTION B

Indicate the level of your agreement with the following statements.

1 Relative advantage

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.1 ICT for management increases my competence as a leader					
1.2 Using ICT for management improves the presentation of my work					
1.3 Using ICT for management decreases operational costs					
1.4 By using ICT for management I have gained competency in my daily activities					
1.5 Using ICT for management has made me more effective in carrying out my daily duties					
1.6 Using ICT for management improves the quality of my work, in general					

2 Compatibility

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
2.1 Using ICT for management will allow me to carry out my day to day duties as normal					
2.2 Pupil results can be analysed through the use of ICT.					
2.3 School finances can be managed and analysed through the use of ICT					
2.4 Pupils' records can be managed through the use of ICT					
2.5 The school timetable can be managed through the use of ICT					
2.6 Work schemes can be managed through the use of ICT					
2.7 Student progress reports can be managed through the use of ICT					

3 Complexity

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
3.1 ICT for management is stress-free to practise					
3.2 It is easy to learn how to use ICT for management					
3.3 ICT for management is easy to understand					
3.4 ICT for management is easy to use					
3.5 ICT for management is easy to apply to a school situation					

4 Trialability

4.1 Did you have a trial period before possible adoption of ICT for management?

Yes	1
No	2

4.2 How much time were you given to try out ICT for Management? (Select **ONE** option only)

We were not given a trial period	Up to a week	Up to 2 weeks	Up to a month	Up to 6 months	More than 6 months

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
4.3 I have tried ICT for management and seen how important it is in decision making					
4.4 Before deciding on whether or not to adopt ICT for management, I am/was able to					

4.5 . Before deciding on whether or not to adopt ICT for management, I am/was able to					
4.6 I have tried to use ICT for management on a trial basis long enough to see what it can					

5 Observability

I have observed that...	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
5.1 Staff who use ICT work more efficiently					
5.2 Staff who use ICT produce well-presented work					
5.3 Staff who use ICT show enthusiasm regarding their work					
5.4 Staff members using ICT for management enjoy using it					
5.5 Staff members seem interested in using ICT for management when they see others					

6. Attitude

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
6.1 I feel comfortable with the idea of the computer as a tool in management and					
6.2 The use of the computer as a learning tool excites me					
6.3 Using ICT for management is a desirable way of running the school					
6.5 ICT for management gives me confidence in doing my work					

7. Usage Intention

I intend to use/continue to use ICT for management in managing….	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
7.1Student Records					

7.2 Financial Records					
7.3 Communication with the Education Offices					
7.4 Staff Personal Information Records					

8 Environmental Factors

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
8.1 The Department of Education has given training on implementing ICT management					
8.2 The Department of education has provided the essential set-up to implement					
8.3 The school has internet					
8.4 The internet connection at the school is reliable					
8.5 The department of education actively encourages the use of ICT					
8.6 There are appropriate policies in place regarding the use of ICT for management;					
8.7 The school has the necessary ICT infrastructure					
8.8 Maintenance on computers is done regularly or as needed					
8.9 Other Principals encourage me to integrate computers into Management					
8.10 There are other schools in the circuit who are using ICT for management					
8.11 I often exchange ideas about technology integration with other principals					

SECTION C ***The contribution of ICT in improving the effectiveness of management in secondary schools***

9 Rate the level of improvement, from 1 = no improvement to 5 = a great improvement, that you have experienced in the following areas of school management **as a result of the use of ICT**

Areas of school management	No improvement				A great improvement
	1	2	3	4	5
Organisation of the approved curriculum					
9.1 Setting up the school timetable					
9.2 Preparing Schemes of work					
9.3 Students' progress reports					
Control of school finance and stores					
9.4 Financial transactions					
9.5 Procurement documents					
9.6 Control of school stores					
9.7 Library catalogue					
Management of human resources					
9.8 Accuracy of staff personal information records					
9.9 Accessibility of staff personal information records					
9.10 Students' admission details					
9.11 Allocation and keeping of records of staff responsibilities					
9.12 Communication with school Staff					
Correspondence with stakeholders					
9.13 Correspondence with all Board of Governors (BOG) and Parents Teachers Association (PTA)					

9.14 Correspondence with education offices					
Management of physical facilities					
9.15 Monitoring of the maintenance manuals for all physical facilities					

Skills of senior managers of secondary schools in using technology in the management of secondary schools

10. Rate your experience (from 1 to 5) with regard to the following: [1 = no experience to 5 = a lot of experience]

	1 = no experience	2	3	4	5 = a lot of experience
10.1 General computer usage					
10.2 Using the computer for management of the school					

11 Do you have any professional ICT qualifications?

Yes	
No	

12 Indicate your computer usage in the following categories:

	Never use	1	2	3	Frequently use
12.1 Microsoft Word					
12.2 Microsoft Excel					

12.3 Document Management					
12.4 Email					
12.5 Power point presentations					
12.6 Internet usage					

13. Indicate your level of skill in the following categories:

	No skill	Poor	Average	Good	Excellent
13.1 Microsoft Word					
13.2 Microsoft Excel					
13.3 Document Management					
13.4 Email					
13.5 Power point presentations					
13.6 Internet usage					

Thank you for participating

ADDENDUM 13: Letter of request to conduct research

Enquiries: A. Kamalizeni P.O. Box 1370
Cell no: 0603930671 Elukwatini
Email address: aubkamalizeni@yahoo.com

The Circuit Manager (Mashishila Circuit)
Gert Sibande Department of Education
1192

Dear Sir

Request for permission to conduct research: Evaluation of the Adoption of ICT in secondary School Management

1. The above has reference
2. I am a Masters student with the University of Kwazulu Natal
3. As part of the masters' programme I have to write a mini dissertation
4. My research topic is "Evaluation of the Adoption of ICT in secondary schools Management: A case study of Mashishila Circuit in Mpumalanga"
5. I therefore would like to request your permission to conduct research in all Mashishila Circuit Secondary Schools
6. The research is scheduled to commence from the 1st to 30 of July 2016 and shall in no way affect the day to day activities of the schools
7. All data collected shall be anonymised and treated in the strictest confidence and no individual or school will be identifiable in the published report
8. Thanking you in anticipation

Yours faithfully

Kamalizeni A

ADDENDUM 14: Permission to Conduct Research

education
MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA

MASHISHILA CIRCUIT
P O Box 178
Elukwatini
Siphumelele TC
Elukwatini 1192
Tel No: (017) 883 7915
Fax no: (017) 883 1017

Litiko Letemfundvo | *Umnyango Wemfundo* | *Umnyango WezeMfundo*

Enq: Mr. T.G Mkhatshwa | Tel: 017 883 7915

TO : **ALL PRINCIPALS**
SECONDARY SCHOOLS

FROM : **CIRCUIT MANAGER**
MASHISHILA CIRCUIT

SUBJECT : **REQUEST FOR PERMISSION TO CONDUCT RESEARCH: KAMALIZENI .A**

1. The above subject has reference.
2. You are requested to support bearer of this letter in his quest to further his studies.
3. Please note that the circuit office is aware about the arrangement and has given its blessing. Kindly see attached letter which outlines the scope of the research.
4. Hope you will find this in order.

Thank you

MR. T.G. MKHATSHWA
CIRCUIT MANAGER

MPUMALANGA PROVINCE
MASHISHILA CIRCUIT OFFICE
2016 -06- 20
P.O. BOX 178, ELUKWATINI 1192
DEPARTMENT OF EDUCATION

DATE

ADDENDUM 15: Ethical clearance certificate

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

07 September 2016

Mr Aubrey Kamalizeni (215082359)
School of Management, IT & Governance
Westville Campus

Dear Mr Kamalizeni,

Protocol reference number: HSS/1289/016M
Project title: Evaluation of the adoption of Information and Communication Technology in Secondary School Management

Full Approval – Expedited Application

In response to your application received on 18 August 2016, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol have been granted **FULL APPROVAL.**

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

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Dr Shenuka Singh (Chair)

/ms

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Cc Academic Leader Research: Professor Brian McArthur
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